



PERSONAL PAINT V 6.4

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Personal Paint

User Guide

Technical Introduction: Page 1

Quick Start: Page 33

User Guide Supplement Follows Page 182





Personal Paint - User Guide

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Contents

1. Introduction to the Amiga Environment	1
1.1 Documentation	1
1.2 System Configuration	1
1.3 Memory	2
1.3.1 Measurement Units	2
1.3.2 Random Access Memory (RAM)	2
1.3.3 The AddMem Command	4
1.3.4 Peripheral Units	4
1.4 File Names and Titles	5
1.5 Drawers	5
1.6 Backup Copies	6
1.7 "Virus" Programs	7
1.8 System Errors	9
1.9 The User Interface	10
1.9.1 Screens and Windows	10
1.9.2 The Mouse and the Pointer	11
1.9.3 Requesters	11
1.9.4 Gadgets	11
1.9.4.1 Action Gadgets, Check Boxes and Cycle Gadgets	12
1.9.4.2 Sliders and Scroll Gadgets	12
1.9.4.3 Text Gadgets	12
1.9.5 Icons	13
1.9.6 Menus	13
1.10 The Keyboard	15
1.10.1 The SetMap Command	16
1.10.2 Graphical Keys	17
1.10.3 Accents	17
1.10.4 The <Shift> Keys	17
1.10.5 The <Alt> Keys	18
1.10.6 The <Ctrl> Key	19
1.10.7 The <Commodore> (or <Left Amiga>) Key	19
1.10.8 The <Amiga> Key	19
1.10.9 The <Caps Lock> Key	19

1.10.10	The Cursor Keys	20
1.10.11	The <Tab> Key	20
1.10.12	The <Return> Key	20
1.10.13	The <BS> Key	20
1.10.14	The <Del> Key	21
1.10.15	The <Help> Key	21
1.10.16	The <Esc> Key	21
1.10.17	The Numerical Keypad	21
1.10.18	The Function Keys	22
1.11	Environment Variables and Standard Drawers	22
1.12	Configuring and Loading Personal Paint	23
1.13	Installing Personal Paint	25
1.13.1	Automatic Installation: The InstallPPaint Program	27
1.14	External User Interface Files	29
2.	Tutorial	33
2.1	Exploring Personal Paint	34
2.2	Gradient Fill	35
2.3	Line Pattern	38
2.4	Combining Text Editing, Image Processing and Stencils	38
2.5	Color Reduction and Remapping	40
2.6	Color Merge	41
3.	The Screen	45
3.1	The Tool Bar	45
3.1.1	Default and Custom Brushes	46
3.1.2	The Painting Tools	47
3.1.2.1	Dotted Freehand	47
3.1.2.2	Continuous Freehand	48
3.1.2.2.1	Line Settings	48
3.1.2.2.2	Area Settings	49
3.1.2.3	Curve	50
3.1.2.4	Straight Line	50
3.1.2.5	Circle	50
3.1.2.6	Rectangle	51
3.1.2.7	Ellipse	51
3.1.2.8	Polygon	51
3.1.2.9	Airbrush	51
3.1.2.10	Fill	52

3.1.3	Text	52
3.1.3.1	The Text Editor	52
3.1.3.2	The Font Requester	53
3.1.4	Image Processing	56
3.1.4.1	Filter Selection	56
3.1.4.2	Edit Filter	57
3.1.5	Snap to Grid	59
3.1.6	Define Brush	59
3.1.7	Zoom	60
3.1.8	Magnify	60
3.1.9	Clear	61
3.1.10	Undo	62
3.1.11	Colors	62
3.2	Moving Around	63
3.3	The Title Bar	63
3.4	The File Requester	64
3.5	The Progress Indicator	67
4.	The Project Menu	69
4.1	Load Image	69
4.2	Save Image	71
4.3	Print Image	72
4.3.1	Page Layout	74
4.3.1.1	Measuring Unit	74
4.3.1.2	Page Format and Size	74
4.3.1.3	Automatic Centering and Manual Margins	74
4.3.1.4	Image Size	74
4.3.1.5	Landscape Orientation	75
4.3.2	System Printer	75
4.3.2.1	Dithering	75
4.3.2.2	Scaling	76
4.3.2.3	Image	76
4.3.2.4	Shade	77
4.3.2.5	Threshold	77
4.3.2.6	Density	77
4.3.2.7	Smoothing	77
4.3.2.8	Color Correction	77
4.3.2.9	Form Feed	78
4.3.3	PostScript	78
4.3.3.1	Image	79

4.3.3.2	Dots per Inch (DPI)	79
4.3.3.3	Lines per Inch (LPI)	79
4.3.3.4	Spot Function	80
4.3.3.5	Output	80
4.3.3.6	Encapsulated PostScript (EPS)	81
4.3.3.7	Crop Marks	81
4.3.3.8	Manual Feed	81
4.3.3.9	Compression	81
4.3.3.10	Process	81
4.3.3.11	Color Separation	82
4.3.3.11.1	Color Correction and Undercolor Removal	82
4.3.3.11.2	The Moiré Effect	83
4.4	Grab Screen	84
4.5	Image and Screen Format	85
4.5.1	Overscan	86
4.5.2	Screen and Image Size	87
4.5.3	Number of Colors	87
4.5.4	Autoscroll	88
4.5.5	Retargetable Graphics (RTG)	88
4.6	Image Processing	88
4.7	Flip Image	88
4.7.1	Horizontal	89
4.7.2	Vertical	89
4.8	Environment	89
4.8.1	Switch	89
4.8.2	Copy to Other	89
4.8.3	Merge in Front	89
4.8.4	Merge in Back	89
4.8.5	Free Current	90
4.9	Show Image	90
4.10	Delete File	90
4.11	Memory Information	90
4.11.1	System Memory	91
4.11.2	Program Memory	92
4.12	Quit	92
5.	The Brush Menu	93
5.1	Load Brush	93
5.2	Save Brush	94

5.3	Print Brush	94
5.4	Process Brush	95
5.5	Restore Brush	95
5.6	Free Brush	95
5.7	Paint Mode	95
5.7.1	Matte	96
5.7.2	Color	96
5.7.3	Replace	96
5.7.4	HBrite	96
5.8	Color	96
5.8.1	Remap	96
5.8.2	Complement	97
5.8.3	Change Background to Foreground	97
5.8.4	Swap Background and Foreground	97
5.8.5	New Transparency	97
5.8.6	Flood Transparency	98
5.8.7	Next Transparency	98
5.8.8	Copy Image Palette	98
5.9	Clipboard	98
5.9.1	Read Brush	99
5.9.2	Write Brush	99
5.9.3	Empty	99
5.10	Resize	99
5.10.1	Stretch	100
5.10.2	Smaller	100
5.10.3	Bigger	100
5.10.4	Halve	100
5.10.5	Halve Horizontal	100
5.10.6	Halve Vertical	100
5.10.7	Double	100
5.10.8	Double Horizontal	101
5.10.9	Double Vertical	101
5.11	Rotate	101
5.11.1	Any Angle	101
5.11.2	90 Degrees	101
5.11.3	Horizontal Flip	101
5.11.4	Vertical Flip	101
5.11.5	Shear	102
5.12	Chop	102
5.12.1	Info	102

5.12.2	Edges	102
5.12.3	Planes	102
5.12.4	Hidden	103
5.13	Outline	103
5.13.1	Simple	103
5.13.2	Square	103
5.13.3	Shadowed	103
5.13.4	3-D	104
5.13.5	Trim	104
5.14	Handle	104
5.14.1	Custom	104
5.14.2	Upper Left	104
5.14.3	Upper Right	105
5.14.4	Center	105
5.14.5	Lower Left	105
5.14.6	Lower Right	105
6.	The Text Menu	107
6.1	Insert Clipboard	107
6.2	Next Color	107
6.3	Preceding Color	108
6.4	Modify to End of Line	108
6.4.1	Color	108
6.4.2	Style	108
6.4.3	Upper Case	108
6.4.4	Lower Case	108
6.4.5	Delete	108
6.5	Style	108
6.6	Alignment	109
7.	The Color Menu	111
7.1	Palette	111
7.1.1	Load Palette	112
7.1.2	Save Palette	112
7.1.3	Edit Palette	112
7.1.3.1	Picking a Color	113
7.1.3.2	RGB and HSB Color Models	113
7.1.3.3	Copy Color	114
7.1.3.4	Swap Colors	114
7.1.3.5	Sort Colors	114

7.1.3.6	Create Range	115
7.1.3.7	Undo	115
7.1.3.8	Hide Requester	115
7.1.4	Adjust Palette	115
7.1.5	Default	116
7.1.6	Restore	116
7.1.7	Copy Brush Palette	116
7.1.8	Copy Font Palette	116
7.1.9	Copy Screen Palette	116
7.2	Stencil	117
7.2.1	Load Stencil	117
7.2.2	Save Stencil	117
7.2.3	Edit Stencil	118
7.2.4	Update Stencil	118
7.2.5	Invert Stencil	118
7.2.6	Stencil On/Off	119
7.2.7	Free Stencil	119
7.3	Remap	119
7.4	Change Background to Foreground	119
7.5	Swap Background and Foreground	119
7.6	Merge	120
7.7	Less Colors	120
7.8	Statistics	121
8.	The Settings Menu	123
8.1	Load Settings	123
8.2	Save Settings	124
8.3	Encryption Key	125
8.4	Audio	126
8.5	Coordinates	127
8.6	Color Reduction	127
8.6.1	Qualitative	128
8.6.2	Quantitative	128
8.7	Color Remapping	128
8.7.1	Simple	129
8.7.2	Pattern Dithering	129
8.7.3	Floyd-Steinberg	129
8.8	File Requester	130
8.8.1	Expand Path	130
8.8.2	Directories on Top	130
8.8.3	Sort by Date	130



8.8.4	Double-Click	131
8.8.5	Confirm Overwriting	131
8.9	Icons	131
8.9.1	No	132
8.9.2	Yes (Default)	132
8.9.3	Yes (Picture)	132
8.10	Language	132
8.11	Tool Bar	133
8.12	Title Bar	133
8.13	Clip Graphics	133
8.14	Backfill Transparency	133
8.15	Color Average Resize	134
8.16	Workbench	134
9.	Other Utilities	137
9.1	AskAssign	137
9.2	ColorText	137
10.	Problem Solving	139
10.1	Memory Shortage	139
10.2	Problems with Disks	140
10.3	Problems with Printers	141
10.4	Problems with Screen Modes and Video Devices	145
A.	Program Messages	147
B.	Command Shortcuts	159
C.	Program and Environment Settings	163
D.	Selection of Amiga Printer Drivers	169
E.	License Agreement and Limited Warranty	173
Index		175

1. Introduction to the Amiga Environment

The user of a new computer system or a new piece of software often encounters equally new words and concepts. This entire chapter is dedicated to explaining the basic concepts which will be dealt with in the following chapters. Also in this chapter, some valuable suggestions on how to get the best from the Amiga, and instructions on how to face some problems that may be encountered.

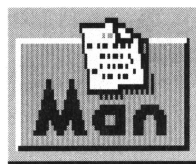
Users already familiar with Amiga terminology and conventions may prefer to read only the last sections in this chapter (1.12 to 1.14: program configuration and installation) and the "PPaint.man" disk-file. Chapter two ("Tutorial") contains some interesting and practical advice.

1.1 Documentation

All information necessary to use the program is contained in this handbook. This guide was written using Personal Write, the word processor developed by Cloanto.

The Amiga handbooks, the printer manuals and those for the other programs used in conjunction with Personal Paint provide additional information on how to interface the program with the external environment.

The file "PPaint.man" on the program disk of Personal Paint contains the most recent updates to the handbook, should there be any. The file can be loaded with a simple double-click of its Workbench icon, or with any word processor or text editor.



1.2 System Configuration

Personal Paint works on any Amiga model with at least 1 Mbyte of main memory (RAM). Many functions of Personal Paint are best exploited with more RAM, especially if there is at least 1 Mbyte of *Chip* RAM (section 1.3.2). On a system with only 512 kbytes of Chip RAM, Personal Paint may have to take measures to limit the amount of occupied memory

(section 1.12). In particular, the audio may remain switched off (unless otherwise specified), the Workbench screen may be closed and the default image format may have fewer colors than usual. If there is enough free memory, Personal Paint tries to avoid requesting the insertion of the Workbench disk after the program has been loaded (e.g. to load the printer driver).

1.3 Memory

The Amiga computer, like most computers, has a main memory (RAM) and peripheral storage units. The following subsections explain the most important notions regarding memory measurement units, different types of memory and some concepts unique to the Amiga environment.

1.3.1 Measurement Units

The smallest unit which is used to measure the quantity of memory is called *bit*. A bit can be in one of two different states, just like the switch of an electric light. The two states are generally defined as 0 and 1, *off* and *on*, *false* and *true* or *cleared* and *set*. This means that a bit can store information.

One *byte* is obtained by grouping 8 bits. There are 256 combinations of the two possible states of the bits in a byte. One byte can thus store 256 (2 to the power of 8) different values, which are usually enough to identify all the letters, numbers and other signs used in a text. There are 1024 (2 to the power 10) bytes in one *kbyte*, while a *Mbyte* contains a little more than one million bytes (1024 x 1024).

1.3.2 Random Access Memory (RAM)

A computer's main memory is made of electronic circuits. A computer must be switched on and properly working to store data in its RAM. A short power failure, or a malfunctioning piece of software can cause the loss of the data stored in the RAM.

A portion of the Amiga's RAM is called *Chip RAM*. While the microprocessor can access all the available RAM, the Amiga custom chips can work only on Chip RAM. The custom chips support the microprocessor in handling graphics, sound and much more. Only Chip memory can be used to open a screen or a window (section 1.9.1, "Screens and Windows"), or store an image which is to be displayed. For this reason, it is possible that even if there is a lot of free memory, a new screen cannot be opened because there is not enough free Chip memory, or the available Chip memory is fragmented (scattered in pieces too small to be used).

The more advanced CPUs of the Motorola 68000 Family (beginning with

the 68020), have a faster than normal working mode, which employs a special *Cache* RAM. Cache RAM is a very fast (and expensive) memory, where the contents of the most recently used locations in Fast RAM are copied (*caching* Chip RAM is more complex, and slower). If a piece of code is executed repeatedly in a tight loop (without referencing any external code), it can be executed entirely from the Cache RAM. The most performance-critical routines of Personal Paint have been designed and tested in order to fully exploit various types of Cache RAM.

Different versions of custom chips and circuitry are mounted in the Amiga computers. Early versions of the Amiga 500, 1000 and 2000 can work with a maximum of 512 kbytes of Chip RAM. Some of these machines can be upgraded by installing new custom chips. More recent models of the Amiga can use one or two Mbytes of memory as Chip RAM, or even more.

Personal Paint stores images using *bitmaps* (or *bitplanes*), i.e. rectangular planes of bits.

The number of contiguous bytes in Chip RAM required by a screen can be calculated as follows:

$$\text{Bytes} = (\text{Width} \times \text{Height} \times \text{Bitplanes}) / 8$$

The maximum number of colors which can be displayed at the same time equals 2 to the power of the number of bitplanes.

In practice, the number of bytes per line is often rounded to the next multiple of 16, 32 or 64, for speed reasons and hardware limitations.

For example, a 32-color, 320 by 200 screen requires about 40 kbytes of RAM. The more memory a screen requires, the higher the system DMA (Direct Memory Access) overhead. Screens having higher resolutions and more colors, in addition to having more data to process, have a higher impact on system DMA (Direct Memory Access), i.e. the Amiga custom chips spend more time accessing the RAM. The custom chips and the CPU (Central Processing Unit, microprocessor) cannot access Chip RAM at the same time, so the CPU must wait longer. This is why the RAM which is not accessed by the custom chips is also called *Fast* RAM.

The amount of Chip RAM required to store an image (or a brush) is calculated in the same way. Bitmaps are also used for the undo buffers and the stencil data (always only one bitplane).

Sections 4.11 ("Memory information") and 10.1 ("Memory Shortage") have more details on Personal Paint's use of memory, and how to reduce the amount of memory used, when this is needed.

Depending on the operating system, blocks of Chip memory are allocated either for each bitplane individually, or for all bitplanes joined together. The latter solution allows for faster processing by the blitter (operating

system version 3.0 and beyond), but requires even more contiguous Chip RAM. "Contiguous RAM" means that a block of contiguous free bytes must be available for the requested size. The indication on the Workbench title bar may be misleading, as it usually represents the sum of all free (and possibly non-contiguous, i.e. fragmented) blocks. The Shell Avail command can be used for a more precise indication of occupied and available RAM.

1.3.3 The AddMem Command

Some memory expansion boards are not automatically recognized by the Amiga. Some early Amiga 1000 RAM expansions fall into this group. When these cards were developed, there was no standard for auto-configuration. This section is dedicated to the owners of such cards.

Very often, the use of the AddMem command is the only way to let the computer know there is some additional memory available. The AddMem instruction must be inserted at the beginning of the Startup-Sequence file of all Workbench disks, including the Personal Paint disk (if it is used as a boot disk). The AddMem file must be copied into the "c" directory of the Workbench disks. The command must be followed by two hexadecimal (i.e. numbers in base 16) numbers which tell the system where the additional memory starts and ends. For some 1 Mbyte cards the command may be "AddMem 200000 2FFFFFF".

For other cards, employing different RAM linking software, the command may be something like a simple "cRAM". The documentation which is enclosed with the Amiga and with the memory expansion gives some more detailed information on this process.

1.3.4 Peripheral Units

Disk drives are peripheral storage units. These devices are slower than RAM, but the data they contain is preserved after the computer is switched off.



The Amiga computer is marketed with at least one disk drive. Standard Amiga drives read and write data on 3.5 inch disks. A 3.5" Amiga disk can contain a minimum of about 880 kbytes, which means that dozens of high resolution fonts can be stored on an empty disk. Newer Amigas employ disk drives with at least twice that capacity. There are, of course, other devices with different characteristics, like hard disks.



A new disk, or a disk which contains unreadable data or data to be deleted, must be formatted prior to use. The Amiga documentation explains how to format a disk. The formatting process clears all the data previously contained on the disk. Section 4.1 ("Load Image") explains how to read and write

MS-DOS disks on the Amiga. Section 10.2 ("Problems with Disks") contains some additional suggestions regarding disks.

1.4 File Names and Titles

A *file* is a generic expression for everything which can be stored: programs, pictures, settings, text or other kinds of data.

When a picture (or any other file) is saved for the first time it must be given a name, which is called the *file name*. To load the picture again, the same name must be written or chosen in a list displayed in the file requester (section 3.4).

AmigaDOS does not differentiate between upper and lower case letters. A file named "Important" can be loaded as "iMpOrTaNt".

The Amiga computer uses some abbreviations to identify its peripherals. "RAM" is the name given to the device which stores its data into main memory. "DF0" is the Amiga standard built-in disk drive. "DF1" is the second disk drive. "DF2" and "DF3" are other drives which can be plugged-in. "RAD" and "VD0" are similar to "RAM", but usually preserve data after a system reset. "DH0", "HD0", "JH0" are some of the names which can be given to hard disks or partitions of hard disks, while "CC0" and other names may be used for PCMCIA memory cards, "CD0" for CD-ROMs, "ND0" for network connections, "PC0" for MS-DOS disks etc. These abbreviations, which are also called *device names*, cannot (or, sometimes, should not) be modified. Most devices have another name, called the *volume name*, which can be freely set and modified. A disk, for example, can be accessed either through its device name (e.g. "DF0") or through its volume name (e.g. "Pictures").

File, device and volume names cannot exceed 30 characters in length. It is better not to use more than 25 characters for a file name, since the Amiga operating system adds the five-character ".info" suffix to the file name to create a graphical Workbench icon.

It is very useful to append standard *suffixes* after file names. A suffix is usually separated from the file name it refers to by a '.' sign. A suffix helps the user to understand immediately what is contained in a file, by reading only the file name. There are many standard suffixes: "gif" for GIF-format picture files, "pcx" for those in the PCX format, "pic" as a generic suffix for picture files, "bsh" for brushes and "set" for Personal Paint settings files. Amiga suffixes are not limited to three characters in length. This is, however, a common habit (and limitation) in other PC environments.

1.5 Drawers

The content of a disk can be logically grouped into parts. These parts are often called "directories" or "drawers" (which are



different from "drives" and "drivers"). Personal Paint label directories with "(dir)" in the file requester (section 3.4). In this guide, as in the official Amiga documentation, "drawer" is more often used.

A disk drawer is very similar to the more familiar drawer we know from the "real" world. It is a container, which can contain both files and other drawers.

One can, for example, use one or more disks to store all the pictures used with Personal Paint. The disk can, for example, contain drawers named "Space", "Cars" and "SwimSuits". The "Space" drawer can again be divided into "Stars" and "Technology" to separate astronomical observations from spaceships, astronauts, etc. The drawers which do not contain other drawers will contain all the pictures of their category. It is possible to have different files having the same name, as long as they are stored in different drawers.

The "path" of a file contains all the information necessary to address it (e.g. "DF0:Space/Technology/Shuttle.gif"). The Amiga handbooks explain how to create a drawer, work with its content and interpret a path name.

Some drawers, like "c", "libs", "l", "s" or "t" are reserved by the Amiga operating system, and usually do not have an associated icon (section 1.9.5). The "Empty" drawer can be duplicated, moved (into other drawers too) and renamed to create new drawers. For this reason, it is better not to write anything into the "Empty" drawer. The "New Drawer" menu of the Workbench (version 2.0 and beyond) can also be used to create a new drawer.

1.6 Backup Copies

Backup copies of disks should be made as often as possible, particularly if the disks contain important information. If a disk is pulled out of its drive while the computer is still writing onto it (the drive light is on), it is very likely that there will be a loss of data. The same will happen if the computer is switched off or there is a power black-out during a disk write. Section 10.2 ("Problems with Disks") describes other problems and possible solutions.



The Amiga operating system displays an error message if it is impossible to read a disk's content properly. If this happens, using the backup copy of the damaged disk may be the only way to recover the lost data. If the disk is new, or if it contains unreadable data, or data which is to be deleted, it must be initialized (formatted) before it is (re)used. The Amiga documentation explains how to format (initialize) a disk or make a copy of it. It is not necessary to format a disk before using it as the target of a

disk-copy operation.

The use of non-system copying programs may cause some problems. The Amiga operating system cannot distinguish between two identical disks. Many programs used to make counterfeit copies of software produce such kinds of identical disks. The insertion or removal of two identical disks may cause a system error or deadlock. Two identical disks generated by non-system copiers should never be in the drives at the same time. The Amiga "DiskCopy" program inserts information like a serial number and time data into the copied disks to distinguish them from the source disk.



It is important that the source disk be write-protected before a backup copy is made. This is the only way to make sure that the original disk is not mistaken for the backup disk. This could lead to the destruction of the data which has to be protected.

Personal Paint can be copied with the standard Amiga copying programs. The conditions under which a copy can be made are contained in the agreement (Appendix E), which must be approved before the program can be used. It is not safe to experiment with the original disks of Personal Paint. A backup copy should be used instead. If any errors occur, the original disks can be used to make a new work disk. It is also preferable not to store any data (e.g. new pictures or other information) on the original Personal Paint disks, as these are nearly 100% full of programs, pictures and other data. The remaining disk space is necessary to store the program's configuration files.

Some disk-copying programs change the name of the copy. For example, the copy of the "PPaint" disk could be named "Copy of PPaint". If this occurs, the "Copy of " (including the space after "of") prefix should be removed to restore the original name. This can be done with the Workbench Rename command.

1.7 "Virus" Programs

Some programs which can interfere with normal system activity are described here. The activity of the so called "Virus" programs resembles their biological homonyms. The difference between "viruses", "worms" and other subspecies will not be discussed here, and they will all be described as "viruses". Several virus programs for the Amiga exist. Some virus programs load themselves from an "infected" Workbench disk. Other programs are activated from an apparently normal program, which certainly has obscure origins.

Not all virus programs damage disk-resident data. Many programs remain hidden in main memory for most of the time. Some programs simply display a message containing the name of the "programmer" who wrote

it, while others save a copy of the virus onto every inserted disk. One program suddenly darkens the display. Many viruses interfere with normal disk or printer activity. Some programs can mess up an entire hard disk, for example adding a few bytes at the end of every accessed file.

Many rumors concerning viruses are not true. It is impossible for a virus program to modify the content of a write-protected disk. The registers of a standard Amiga battery backed-up clock cannot be used to store a virus program.

Virus programs can remain in RAM for some seconds after the computer has been switched off. The Amiga should be left off for at least 30 seconds to make sure a RAM-resident virus is removed. A <Commodore>+<Amiga>+<Ctrl> system reset usually never removes the virus program, but in many cases activates it, so that it can copy itself on the next Workbench disk inserted. It is always better to keep Workbench and other read-only disks write-protected. A backup copy (if authorized) of every new program disk should be made. The computer should be switched off after a "borrowed" piece of software has been run.

A virus program can become dangerous only if it is loaded. A "boot-block" virus is automatically loaded when the system boots up. The AmigaDOS "Install" command is usually sufficient to remove such a program from the disk. Both "Install" and some viruses can interfere with the copy protection scheme used by some commercial programs, which may then not work any more. Some viruses insert a call to themselves into the Startup-Sequence. (The AmigaDOS "Install" command mentioned here should not be confused with the install sequence of Personal Paint, described in section 1.13.1.)

Some apparently normal programs, like a few AmigaDOS "dir"-like programs, activate a virus. Many illegally copied disks contain viruses. One infected disk in a clandestine reproduction center may be sufficient to activate a chain reaction.

Link-viruses insert or append themselves in normal program files, where they remain inactive until the other program is loaded. Many viruses replace Amiga system functions with some of their own, which may even appear to work normally for a long time, until some event triggers an unexpected type of action.

Several commercially available programs detect and remove viruses, both on disk and in RAM. There are also quite safe and inexpensive "public domain", "freeware" and "shareware" programs, like "VirusZ", "VirusChecker", "VirusX", "AntiCicloVir", "LVD", "BootX" etc., which are regularly updated.

Some RAM-resident "antivirus" programs are very similar to viruses. In fact they can even hide a virus. No program can determine if another

program has "good" or "bad" intentions, especially if the "good" program reproduces itself like a virus. For this reason, a program which is not (officially) a virus may be detected and signalled as a virus.

1.8 System Errors

The Amiga operating system, like most other complex programs, is not completely error-free. In some particular circumstances, as when there is very little free memory left, some unexpected things can happen. This can lead to a "Software Error" message (which on older versions of the operating system could end with a "Guru Meditation" alert).

Some programs, or combinations of programs running at the same time, can also cause such errors. Each version of Personal Paint has to pass months of hard testing before it can be marketed. Nevertheless, it is sometimes possible for a system error or another program to lock Personal Paint.

The first thing to do when a "Software Error" message appears is to store all the work which could be lost if the content of the RAM is deleted. It is very dangerous to press the "Cancel" button of the requester before the work has been saved.

After the current work has been saved, all running programs should be terminated. Then all disks should be pulled out of their drives, and the computer must be switched off. This is to make sure that a virus program, if present, is removed from memory.

Some Amiga programs do not have any screen depth arrangement gadgets. It may sometimes be necessary to display another screen when one of these programs has its own screen open. The Workbench screen always comes to the front when the <Commodore>+<N> keys are pressed. <Commodore>+<M> can be used starting with version 2.0 of the operating system to cycle through different screens. Otherwise, Personal Paint can be brought to the front by holding down <Shift> while a disk is ejected. Other Cloanto programs use the <Help> key for this purpose.

Sometimes, when the system is short of memory, an "Alert" message is displayed in place of a requester. The color of the alert message is red for all versions of the operating system until 1.3. From version 2.0 alerts are displayed in other colors (green, orange, etc.), while red is reserved for the more serious "Guru Meditation" (this funny name has also been changed in newer versions of the operating system) and other emergency messages. When Personal Paint cannot find enough memory to open a requester it displays a message. Other programs may be terminated, or windows may be closed, to try to free some memory. Alert messages can be removed by pressing any mouse button.

1.9 The User Interface

The physical, sensorial and intellectual space between the computer and the user is called "user interface". The user interface can frighten or excite the first-time computer user. The user interface can frustrate or stimulate a computer operator.

The Amiga user interface uses graphics, menus, requesters, gadgets, a keyboard and a mouse to make the approach to the machine as intuitive as possible. Personal Paint has been designed in order to surround the user who paints or performs image processing with an environment as simple and complete as possible. It was possible to refine the user interface thanks to the feedback of an unusually large test group and a multitude of interviews.

1.9.1 Screens and Windows

The computer display contains one or more screens of the programs which are running. Each screen can contain several windows (which can overlap), requesters and gadgets. Each screen may have its own resolution and colors.

Personal Paint adapts itself to the graphic environment when it opens its screens. The program accesses the system *Display Database* to get a list of available screen modes, their sizes and maximum number of colors. On systems where the Display Database is unavailable (before version 2), other methods are employed.

When the screen is first opened, a default resolution and number of colors is used. This can be modified manually, or by loading an image. The program's default initial settings can also be redefined, as explained in section 1.14 and appendix C. The format of the displayed image does not need to be identical with the format of the screen in which it is displayed. An image larger than the screen can be scrolled (section 3.2). Sections 4.1 and 4.5.2 have more on the different screen modes.

Sometimes, when some models of the Amiga are switched on, the power supply frequency may not be recognized correctly, so that a 200 line NTSC Workbench screen is opened on a PAL system (which normally supports 256 lines). This usually does not happen very frequently. It should be noted that PAL and NTSC modes are not necessarily linked to the power supply frequency. It is possible, for example, to refresh a NTSC screen 60 times every second with a power supply frequency of 50 Hz, if the display device can recognize the video frequencies correctly.

A window can be as large as a screen, or much smaller. If it is smaller, it can be dragged around the screen with the mouse. Personal Paint has a main window as large as the screen, and other windows (requesters) used to set the different program parameters. The screen of Personal Paint can

also be dragged with the mouse when the pointer is over the title bar.

1.9.2 The Mouse and the Pointer

The mouse is a pointing device connected to the computer. A pointer can be moved on the screen by using the mouse. The pointer is a graphical symbol (by default an arrow) displayed on the screen. When the mouse is moved on the desk, the pointer moves in the same direction. The Amiga documentation explains how to modify the standard pointer image, its size (on Advanced Graphics Architecture systems) and the speed at which the pointer reacts to mouse movements.

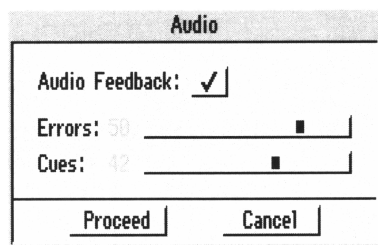
Personal Paint exploits the middle mouse button of three-button mice, if available. This function (mainly used to move the image) can be emulated by pressing <Alt> plus the left mouse button.

Personal Paint uses different pointer images to inform the user about what can be done with the mouse at a particular position on the screen (e.g. select a tool, pick a color, fill, define a brush, etc.).



1.9.3 Requesters

A *requester* is a particular kind of window which can contain text, buttons (also "gadgets", or "tools") and sliders ("knobs", or "proportional gadgets") which can be set by means of the mouse to change system or program settings.

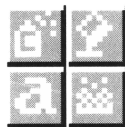


1.9.4 Gadgets

A *gadget* can be selected with the mouse. To select a gadget, the mouse pointer must be moved over the gadget and the left mouse button must be pressed.

Personal Paint has one or more gadgets at the top right corner of its screen. The gadgets can be used to move the screen to the back or to the front of other screens. These are the default Amiga gadgets for screen depth arrangement, and may vary depending on the version of the Amiga operating system.

Gadgets are also used in requesters and in association with the most used drawing and image processing tools. These are displayed on the left of the main window, and are explained in detail in Chapter 3.



1.9.4.1 Action Gadgets, Check Boxes and Cycle Gadgets

Action gadgets perform a specific operation when selected. They may be used to perform a graphical operation, or open a requester for selecting some parameters. The gadgets which are displayed on the Tool Bar (section 3.1) may activate different options depending on the mouse button (left or right) which is used and the part of the gadget (upper or lower half) which is selected.

Check boxes toggle from being blank to containing a checkmark. They represent options which may either be turned on or off.

Cycle gadgets are used to choose an option from a series of several possibilities. A "cycle" symbol appears on the left of the gadget. The text which is displayed in the gadget indicates the currently selected option. Repeated selections of the gadget select the following options. If <Shift> is held down during the selections, the order in which the options appear is reversed.

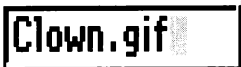
1.9.4.2 Sliders and Scroll Gadgets

Sliders (proportional gadgets) are used to set a value from a given range (color intensity, sound volume, etc.) While the graphical knob of the gadget is selected, it can be moved with the mouse, increasing or reducing the associated value. Clicking in the box which contains the knob increases or decreases the value by a single unit. This may be especially useful if the resolution of the pointing device (mouse, trackball, etc.) is too "grainy" to pick the knob and move it by one unit at a time.

Scroll gadgets are sliders which are used to scroll up or down a view of a longer list of items. Two scroll-arrow gadgets are used to move in fine steps. Sections 3.1.8 and 3.4 explain in more detail the use of scroll gadgets to move around a magnified image, and scroll the list of files in the file requester.

1.9.4.3 Text Gadgets

Text gadgets (also "string" gadgets) are yet another kind of gadget. After a text gadget has been selected, the text which is contained in the gadget can be modified using the keyboard. The existing text should be deleted before the new text is entered. Text gadgets are used, for example, to manually type the name of a file. A text gadget is "activated" when the cursor is displayed in it. A text gadget can be activated by selecting it with the mouse.

File: 

The Amiga operating system interprets some keyboard shortcuts to edit the text contained in text gadgets. <Amiga>+<X> can be used to clear all the text in the text gadget, while <Amiga>+<Q> restores the initial text. To enter these shortcuts, the <Amiga> key to the right of the <Space> bar has to be held down while the other key is pressed.

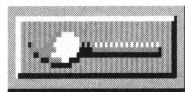
There is a limit to the maximum number of characters that will fit in each text gadget. If more characters are typed than the text gadget can contain, the screen will flash to signal an overflow. If this happens, the content of the text gadget must be deleted (or at least made shorter) with the <BS> or <Del> keys before the new text can be typed from the keyboard. Some text gadgets only accept numerical characters. These are called *numerical* (or "integer") gadgets. If a letter is typed in a numerical gadget, the screen will flash, and the character will not be accepted. The maximum number of characters which fit in such a gadget is generally designed so that unacceptable (too big) values cannot even be typed. This means that there is little margin for editing the text, and the screen will frequently flash to signal that it is necessary to delete the previous number before typing the new one.

1.9.5 Icons

The Workbench program of the Amiga operating system uses another type of gadget: *icons*. Icons can be associated to disks, drawers and files. An application may use custom-designed icons, which occupy a small amount of disk space in so-called ".info" files. Files or drawers without an explicitly associated icon may be displayed with default Workbench icons (version 2 and beyond of the operating system), or be accessed through the Shell interface.



Personal Paint can associate different kinds of icons with the files that are saved (e.g. pictures, brushes or settings files). All icons have been designed for optimum performance on the Amiga filing systems. Almost 900 Personal Paint file icons will fit on a standard 880 kbyte disk. Section 8.9 explains how Personal Paint can be programmed to save its default icons, if so desired.



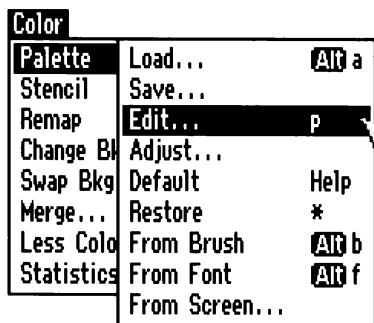
Both the images and other attributes (Default Tool, Tool Types) of the default icons used by Personal Paint can be modified by editing the icons stored in the PPaint Icons drawers (there are drawers containing icons suitable for different Workbench colors).

1.9.6 Menus

The Amiga menu system offers an easy way to explore a program and select from many different functions without having to remember difficult commands. In addition to gadgets, menus are the simplest and most

complete method of selecting a command with Personal Paint.

When the mouse pointer is over the title bar (or over the first line of the screen, if the title bar is not displayed), and the right mouse button (the menu button) is pressed, the menu bar is displayed.



The menu bar contains a list of topics, called menus. When the mouse pointer is moved onto a topic of the menu bar (with the menu button still held down), a list of menu items appears below the menu name. An item can have a subitem list. The subitem list is displayed when the mouse pointer is moved over the menu item. To execute the program function associated with a menu item or subitem, the mouse menu button must be released when the

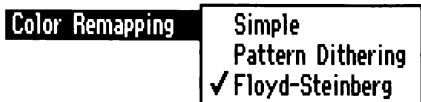
mouse pointer is over the desired item. If a menu item has a command-key shortcut, the appropriate command-key sequence has the same effect as the menu selection. More than one item at a time can be selected by pressing the select mouse button (the left mouse button) when the mouse pointer is over the desired items, without releasing the menu button.

When the menu button is pressed, the titles of the different menus are displayed in the title bar. The following are the chapters in which their content is discussed:

- Chapter 4 - Personal Paint: The Project Menu
- Chapter 5 - Personal Paint: The Brush Menu
- Chapter 6 - Personal Paint: The Text Menu
- Chapter 7 - Personal Paint: The Color Menu
- Chapter 8 - Personal Paint: The Settings Menu

When a menu item is selected with the right mouse button, a program function is executed (or a requester is displayed). If the menu button is released when the mouse pointer is not over a menu item, nothing happens.

When a menu brings up a requester, its name is followed by three dots, whereas an arrow to the right of the menu item's name indicates that a list of subitems would appear if that item were highlighted.



Some menu items, called "attribute items" (like "Brush Handle" and "Color Remapping") can have a checkmark to the left of the text. Menu attribute items

remain "checkmarked" until they are deselected by selecting another item.

If the program "knows" that it would not make sense to select a menu

item, that particular item is disabled. Disabled menu items are displayed in a "ghosted" fashion. The text normally displayed in the menu item is overlaid with a faint pattern of dots. A disabled menu item cannot be selected with the mouse. The "Brush" and "Text" menus are among those containing items which can be automatically disabled by the program. For example, "Save Brush" is disabled when the brush mode is not active.

It is often faster and more efficient to press one or two keys on the keyboard rather than move a hand from the keyboard to the mouse. A keyboard shortcut which can be used instead of the mouse selection appears on the right of the most used menu items. In Personal Paint for the Amiga computer these menu items are followed by a reference to a single key (and an optional qualifier, like <Amiga>, <Alt>, etc.) The same functions which can be recalled using menus can be selected by pressing the indicated key. It is important that the key is typed exactly as displayed on the right of the menu, since upper and lower case keys are interpreted differently and used for different functions.

Little "qualifier"-key symbols may precede the keyboard shortcut, indicating that another key (<Shift>, <Alt>, <Ctrl>, <Amiga>) must be held down when the shortcut-key is pressed. The "Num" symbol indicates that the shortcut which follows must be typed from the separate numerical keyboard. Not all Amiga models have a numerical keyboard. This option does not apply to the upper four keys of the keypad (which cannot be distinguished from the other keys having the same symbols).

A warning requester appears if the selected function could overwrite a stored file, or cause the irrecoverable loss of any kind of data which has not been saved.

Appendix B lists the default keyboard shortcuts associated to menu items. The user interface files may be freely viewed and modified (i.e. new or different shortcuts can be set). Section 1.14 explains how to apply such changes.

A detailed explanation of all menus and the associated commands and requesters follows in Chapters 4 to 8.

1.10 The Keyboard

The Amiga keyboard has different types of keys. Graphical keys have an associated character. Other keys (<Shift>, <Alt>, <Ctrl>, <Commodore>, <Amiga>) work only if they are held down when another key is pressed. So-called "dead keys" are used to modify the output of the next-pressed key. Most dead keys are used to specify that a diacritical sign is to be placed on the next character typed. Other keys are associated to program or system functions (<Caps Lock>, cursor keys, <Tab>, <Return>, <BS>, <Del>, <Help>, <Esc> and function keys).

1.10.1 The SetMap Command

The Amiga computers are manufactured with different keyboards, designed to match local languages. When using operating system versions prior to 2.1, an appropriate "SetMap" command must be put in the Startup-Sequence to tell the system which keyboard is connected to the computer. The Amiga documentation explains this process in more detail. Starting with version 2.1, the Keyboard Type can be chosen from a list using the system's Input Preferences.

If no SetMap command is executed on systems where it is required, the Amiga behaves as if a standard USA keyboard is connected. If a wrong SetMap argument (corresponding to a keyboard which is not the one connected to the computer) is given, the Amiga interprets and displays the characters of the selected keyboard, rather than those of the real keyboard.

When the Workbench disk of Personal Paint ("PPaint" disk) is reconfigured by double-clicking on one of the language icons (e.g. "English", "Deutsch", "Italiano", etc.), an appropriate "Startup-PPLclExe" file is moved to the "s" directory of that disk. This file contains a "SetMap" command which instructs the Amiga to recognize the most used keyboard in the country to which the selected configuration file refers. "SetMap d", for example, is used to work with a German keyboard, while "SetMap f" instructs the Amiga to work with a French keyboard.

After the initial configuration, the line of the "Startup-PPLclExe" file containing the SetMap command may be changed if the argument (i.e. the language code appearing after the command) does not match the keyboard being used. A word processor like Personal Write can be used to modify the file, as long as the file is saved in ASCII or ANSI X3.64 format.

Some programs are not designed to work with non-USA keyboards. These programs directly translate key position codes into characters, using a program-internal conversion table. The SetMap command has no effect on the behavior of these programs.

Some keyboards have the <Y> and <Z> keys reversed. The command "Nimm3 -y" can be written after the SetMap (but not "SetMap usa") command to swap the two keys. Nimm3 is a utility available from Cloanto.

The correct SetMap command, if required by the operating system, must be inserted in the Startup-Sequence of every Workbench disk which is used.

1.10.2 Graphical Keys

Graphical keys are the keys which can be used to display letters, numerals and other signs. Graphical keys are used in Personal Paint's Text Editor (Section 3.1.3.1 and Chapter 6), to edit the content of text gadgets, and as command shortcuts. When a graphical key is pressed while a text gadget is activated, the associated character is written and the cursor is moved to the next character position.

Graphical keys are automatically "repeated" if they are held down for a while. The initial repeat delay and the interval between repetitions can be set with the "Preferences" program (Input Preferences, in version 2 of the operating system), as described in the Amiga documentation.

1.10.3 Accents

Some keyboards have one or more accent keys. Accent keys can be used during text editing or in string gadgets. Keys with accents (and other diacritical signs) must be pressed immediately before (not at the same time as) the key whose output has to be changed.

If the grave accent key (<`>) and the acute accent key (<`>) are pressed in sequence, a circumflex accent is placed on the following character.

Special combinations of keys can be used if the keyboard does not have accent keys to access diacritical signs directly. The keys <Alt> + <F>, <G>, <H>, <J>, <K> respectively put on the following character an acute accent, a grave accent, a circumflex accent, a tilde or a dieresis (umlaut). The <Alt> key must be pressed when one of the above letters is typed. The character on which the diacritical sign is to be put has to be typed separately, after the <Alt>+key combination.

Some Amiga fonts may lack accented characters, i.e., in general, the characters whose code in the computer's character set is greater than 126. This does not affect the Personal Paint user interface (which employs its own font) but may be a limitation when using the text editor. Where these characters are required, if no other font is available, the existing font should be modified with a program like the Personal Fonts Maker.

1.10.4 The <Shift> Keys

On most keyboards an outline of an upward-arrow is drawn on the <Shift> keys, while on other keyboards "Shift" is written on the keys. The two keys are on the extreme left and right of the row of keys just over the <Space> bar. There is no functional difference between the two <Shift> keys.

When a graphical key is hit while <Shift> is pressed, an upper case letter, or the character drawn on the upper part of the keytop cover are sent to

the computer.

If <Shift> is held down while a cycle gadget is selected (section 1.9.4.1), it is set to the previous of the available options, rather than to the following one. In any one of multiple text gadgets, <Shift>+<Return> moves the cursor to the previous gadget, rather than to the following one.

When the <Shift> key is held down, the cursor keys move the image pixel by pixel (section 3.2), rather than in larger steps. In text editing mode (section 3.1.3.1), shifted cursor keys are used to jump to the first or last character of the line (or line of the text).

If <Shift> is held down when working with a painting tool, mouse movements are confined to the vertical or horizontal axis, depending on the direction in which the mouse is first moved after pressing the key.

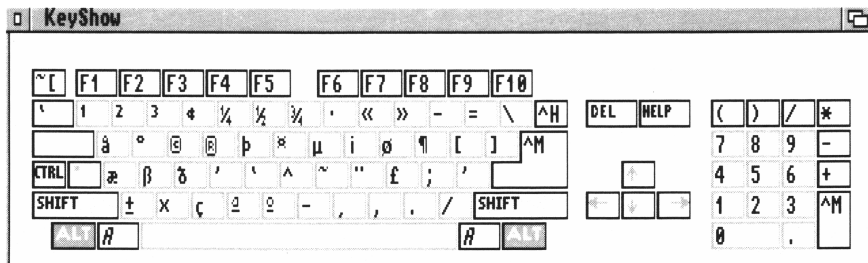
If <Shift> is pressed when a disk is ejected from its drive, Personal Paint pops up to the front of other screens. This is an emergency solution to be used if other programs do not allow their screens to be moved to the back. This may seem an idiosyncrasy of the software, but the "Disk Ejected" message is one of the very few which the Amiga operating system transmits to programs even when their window is not the active one.

This key is a valid qualifier for keyboard shortcuts (section 1.14), but should only be used for keys which do not have a different graphical representation for the shifted key.

1.10.5 The <Alt> Keys

The two <Alt> keys are just under the <Shift> keys. There is no functional difference between the two <Alt> keys, except in the <Ctrl>+<Left Alt> combination used for grabbing screens (section 4.4).

The alternate ("Alt") characters associated with the keys which are hit are sent to the computer while <Alt> is pressed. The alternate characters do not usually appear on the keyboard, but they are described in the handbooks and can be displayed with the "KeyShow" (or "KeyToy") program. Several accents, special and national characters can be accessed with the <Alt> key.



Holding down <Alt> when pressing the left mouse button has the same effect as using the middle button of three-button mice.

This key is a valid qualifier for keyboard shortcuts (section 1.14).

1.10.6 The <Ctrl> Key

The <Ctrl> key is on the far left of the keyboard.

Grab Screen (section 4.4) responds to this key, when pressed at the same time as the left <Alt>. With the left mouse button, it is used to move the offset of some types of overscan screens (sections 3.2 and 4.5.1).

This key is a valid qualifier for keyboard shortcuts (section 1.14).

1.10.7 The <Commodore> (or <Left Amiga>) Key

The <Commodore> key is on the left of the <Space> bar. On some keyboards there is a full Amiga-like 'A', while on other keyboards there is a Commodore sign.

The <Commodore> key is used to recall some functions of the Amiga operating system. <Commodore>+<N> brings the Workbench screen in front of all other screens. <Commodore>+<M> moves the screen into the background. In version 2.0 and beyond of the operating system, <Commodore>+<M> flips from one screen to the next, without any distinction for the Workbench screen.

1.10.8 The <Amiga> Key

The <Amiga> key is on the right of the <Space> bar. An outline of the letter 'A' appears on the key.

A graphical key can be pressed while the <Amiga> key is held down to execute a command in a text gadget (section 1.9.5.3).

This key is a valid qualifier for keyboard shortcuts (section 1.14), and is well-suited for shortcuts to be entered during a text editing session (where other qualifiers would cause a character to be typed, rather than be executed as a command).

1.10.9 The <Caps Lock> Key

The <Caps Lock> key, located between the <Ctrl> and the letter keys is the only key with a small light.

Whenever the key is pressed, the light changes state: from on to off, and vice versa. When the light is on, the keyboard behaves as if a <Shift> key is pressed. <Caps Lock>, unlike <Shift>, works only on letter-keys. However, it can be made to work on all keys, by using "Nimm3 -c"

(section 1.10.1).

1.10.10 The Cursor Keys

The four cursor keys are on the left of the numeric keypad.

The cursor keys can be used to scroll the image in the selected direction, or move the text cursor in editing mode. Section 1.10.4 describes the effect of the <Shift> key on these operations.

When a cursor key is pressed briefly, the cursor (or the image) moves by one position in the indicated direction. If the key is held down, the cursor (or image) continues to move, pausing between each step. The delay between the repetitions can be set with the system Input Preferences.

In string gadgets (as in text editing mode) the cursor cannot be moved more than one position beyond the end of the text. If the <Shift> key is held down while one of the two cursor keys is pressed, the cursor will jump to the farthest possible position in the specified direction.

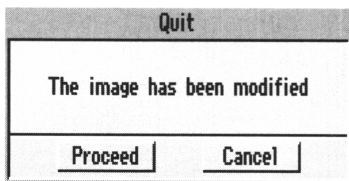
1.10.11 The <Tab> Key

The <Tab> (from "Tabulate" and "Tabulator") key is just over the <Ctrl> key. There are usually arrows on the key, but the earlier keyboards have "Tab" written on the keytop.

In text editing mode, <Tab> brings the character under the cursor to the column whose number is the next multiple of eight.

1.10.12 The <Return> Key

The <Return> (from "carriage return") key is on the right of the letter keys. Personal Paint interprets the <Enter> key on the numerical pad like the <Return> key, unless otherwise specified by a specific custom shortcut definition (section 1.14).



When a requester contains only the OK gadget, the <Return> key can be pressed to remove the requester.

If a requester has only two gadgets (Proceed and Cancel), pressing the <Return> key is equivalent to selecting Proceed. The <Esc> key can be used to choose Cancel.

1.10.13 The <BS> Key

The <BS> (from "Back-Space") is just over the <Return> key. Some keyboards have a left-arrow on the keycap, while others have

"BackSpace" printed on the key.

In text editing mode (or when a text gadget is active), <BS> moves the cursor onto the preceding character, which is deleted.

1.10.14 The <Del> Key

The <Del> (from "delete") key is on the right of the <BS> key.

When <Del> is pressed in text editing mode, or while a text gadget is active, the character under the cursor is deleted. The cursor is not moved.

During graphical operations, <Del> can be used to toggle between the hidden and the displayed status of the cross-shaped mouse pointer.

1.10.15 The <Help> Key

The <Help> key is on the right of the letter keys.

<Help> resets the default program colors. It also works in the requesters used for setting and adjusting colors.

1.10.16 The <Esc> Key

The <Esc> (from "escape") key, at the top left of the keyboard, can be used to terminate the text editing session (section 3.1.3.1) or leaving a requester containing only one or two gadgets.

When a requester contains only the OK gadget, the <Esc> key can be pressed to remove the requester (exactly like <Return>).

When a requester having only two gadgets (Proceed and Cancel) is displayed, pressing the <Esc> key is equivalent to selecting the Cancel gadget. The <Return> key can be used to choose Proceed.

1.10.17 The Numerical Keypad

This part of the keyboard duplicates the keys which are most used in a numerical context. Not all Amiga computers have this keypad (which is located on the far right of the keyboard).

As the number of functions to which a keyboard shortcut can be assigned increases, "free" keys become a precious resource. At a certain point, it becomes useful to differentiate between those keys which appear twice on the keyboard. As explained in sections 1.9.6 and 1.14, the keys on the numerical keyboard (except those belonging to the first row) can be given a special treatment.

For example, the digits on the numerical keypad are very useful for quickly selecting one of the nine possible user-defined brushes (section 3.1.1).

1.10.18 The Function Keys

The ten function keys are aligned in the topmost row of the keyboard, over the letter keys. The keys are numbered from <F1> to <F10>.

Personal Paint accepts the use of function keys as a shortcut to select certain program functions, as explained in section 1.14 and Appendix B.

If the <F1> key is held down while Personal Paint is starting, the *memory save mode* (section 1.12) is activated.

1.11 Environment Variables and Standard Drawers

Several program functions which access data on peripheral devices such as disks, have default paths where they read or write data unless specified otherwise by the user. The original disk on which the Personal Paint program and some data files are stored is named "PPaint". "PPaint" is therefore the volume name which appears at the beginning of the default paths (section 1.5) used by Personal Paint. Personal Paint also uses standard drawer names, like "PPaint_Prefs" or "Pictures", to access different kinds of data.

As described in section 1.13 (automatic installation), Personal Paint and the other files can easily be installed or moved onto a volume other than the "PPaint" disk. If the material on the PPaint disk is moved all together, it is sufficient to execute a command like "Assign PPaint: NewPosition". If, for example, Personal Paint is installed inside a drawer called "PPaint", on the partition of a hard disk with the default "Work" name, the command will be

Assign PPaint: Work:PPaint

Section 1.5 ("Drawers") explains how to create a new drawer. The "Assign" command should be put in the User-Startup file or at the beginning of the Startup-Sequence file of the disk from which the system is booted (e.g. the hard disk). The "Assign PPaint: ..." command tells the Amiga operating system where to search for the data addressed through the "PPaint" name. The new location is called a *logical device*, as opposed to *physical devices* like disks. In this way, the data can be found even if it is no longer on the disk called "PPaint". The "Assign" command may fail if a volume (e.g. a disk) called "PPaint" is in use (e.g. currently inserted, or used as the boot disk) while the command is executed, as it is impossible to define a new path for a name currently in use. A physical device called "PPaint" always has priority over a logical device with the same name. This means that if "PPaint" has been defined with the "Assign" command, and a "PPaint" disk is currently in a drive, the disk will be accessed rather than the logical device.

Section 9.1 explains how to use the AskAssign program to create drawers

and assign logical names using the mouse, rather than the AmigaDOS "Assign" command. Sections 1.12 and 1.13 respectively describe configuration and installation of Personal Paint. Advanced configuration is described in section 1.14.

The most simple manual way to copy PPaint and the data files and drawers to a new device is by using the mouse. All Personal Paint files and drawers have an associated Workbench icon. Moving the files to a new position is as easy as moving their icons. Experience teaches that it is convenient to dedicate a disk or a drawer to the Personal Paint files and drawers. This may, for example, be a "PPaint" drawer on a hard disk. If only part of a drawer is to be copied to a new location, a new drawer with the same name can be created (as described in section 1.5) and the requested files from the source drawer can be copied separately.

Before Personal Paint is first run after it has been installed on a new device, the "PPaint" logical device must be appropriately defined with the "Assign" command, as described at the beginning of this section. This can be done by typing the correct "Assign" command in the Shell, or re-booting the system from a device having a "Startup-Sequence" or "User-Startup" file containing the "Assign" command.

1.12 Configuring and Loading Personal Paint

Personal Paint, the operating system software and several support programs and data are stored on a 3.5" disk. Pictures, color fonts and other files are stored on additional disks. Colorful pictures occupy most of Personal Paint's second disk. This second disk may be, at random, any disk from a collection of disks which can be enclosed with the product as well as circulate separately.

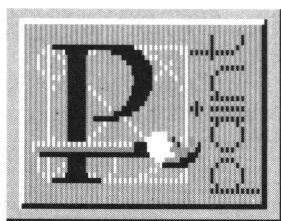


Before the program is configured or used, a backup copy of the disks should be made, to be used instead of the original disks. This operation is described in section 1.6.

Personal Paint is shipped in multilingual versions. This means that the same set of disks can be used to work with different language versions of the program. The default language of the Personal Paint disk can be modified by double-clicking on one of the configuration files on the program disk, which are named after the language which they install (e.g. "English", "Deutsch", "Italiano", etc.) The *configuration* process should be run before installing the program (the installation script is also translated). The SetMap command of Personal Paint's startup sequence and the colors of the Workbench icons (which differ in the different versions of the Amiga operating system), are also updated by the configuration. An already configured disk may be reconfigured as often as necessary.



The computer must be switched on and be operating properly in order to load Personal Paint. If the insertion of the Kickstart disk is requested (on the Amiga 1000), the Kickstart disk must be inserted in drive 0. Personal Paint works with Kickstart version 1.2 and beyond. Version 1.3 (or higher) of the Workbench disk contains all other library files which the program needs to run. This does not imply that version 1.3 of the system ROM or the Kickstart disk are needed. The program works fine with a 1.2 ROM (or Kickstart disk) and a 1.3 Workbench disk. The Cloanto Workbench disk containing Personal Paint can be inserted when the system requests the insertion of the Workbench disk. If the computer has less than 1 Mbyte of Chip RAM, the Workbench screen is closed automatically to save memory, and is reopened after exiting from Personal Paint (or manually, as explained in section 8.16).



If the computer has sufficient RAM, Personal Paint can be loaded from the Workbench or Shell, as described in the Amiga documentation. When the Workbench icon of Personal Paint is selected, or the command "PPaint" is given in the Shell, the program is loaded. Personal Paint is also loaded when an icon of a picture or data file saved by Personal Paint is selected (double-clicking the left

mouse button when the pointer is over the icon). In this case, Personal Paint also loads the selected data (a picture, brush, etc.). At the end of the Startup-Sequence on the Personal Paint disk the program is loaded automatically. This means that if the Personal Paint program disk is inserted when a Workbench disk is requested by the Amiga, Personal Paint is loaded automatically.

The syntax to load Personal Paint from the Amiga Shell is the following (the square brackets indicate that an optional picture file name can be written):

```
PPaint [picture-file]
```

If a program is started from within a Shell window, the window can often be closed (with "EndCLI", or "Exit", if a Cloanto disk was used to boot) only after the program terminates. This can be avoided (i.e. the window can be closed during the execution of Personal Paint) if the program is started with the following command format:

```
Run >NIL: <NIL: PPaint >NIL: <NIL: [picture-file]
```

If the program cannot start, it returns an error code. If Personal Paint is run from the Shell, one of the following error codes will be returned:

Code	Meaning
------	---------

- | | |
|----|---------------------------------------|
| 21 | "Intuition.library" cannot be opened. |
| 22 | "Icon.library" cannot be opened. |

Code Meaning

23	"DiskFont.library" cannot be opened.
24	"Graphic.library" cannot be opened.
25	"Layers.library" cannot be opened.
26	Screen cannot be opened.
27	Insufficient memory for initial allocation.
28	Main window cannot be opened.

Appendix A contains a complete listing of program messages, explained in detail.

There are some tricks to further reduce the consumption of memory, which are especially useful when less than 1 Mbyte of Chip RAM is available. If a disk other than the PPaint disk is used for booting, then the boot procedure should be interrupted as soon as possible by pressing <D> while the <Ctrl> key is held down. If the Workbench program has not been loaded (i.e. if no disk icon appears under the window after it is made smaller with the mouse) it has to be loaded by typing "LoadWB". Then the window must be closed by typing "EndCLI" (these commands can also be written entirely in lower case). The PPaint disk icon must be double-clicked to open the window containing the PPaint program icon. At this point, Personal Paint can be started by double-clicking the program icon. As soon as the mouse pointer turns back into its standard arrow image (from the busy mode image), the window containing the PPaint program icon should be closed by clicking the gadget on the upper left of the window. This requires a quick reaction, but saves additional memory. Personal Paint will automatically close the Workbench screen to save even more memory. All these measures ensure that Personal Paint can be used as normally as possible in low-memory conditions. Personal Paint will work even if it is loaded in a different way, but when memory is so precious it is always preferable to have as much of it as possible free for use by the program.

When Personal Paint is loaded, it searches for the "Startup_1.set" and "Startup_2.set" files in the "PPaint: PPaint_Prefs" drawer to determine the initial settings of the two environments. If these files cannot be accessed or if they contain errors, internal default settings will be used. The lower-priority "Startup_A.set" file (which contains information on the user interface language), and different "UIColors" (user interface colors) files, are also checked.



1.13 Installing Personal Paint

This section explains how to integrate Personal Paint into the hardware and software environment in which the program is to be used. All information necessary to move Personal Paint to a device other than the

disks on which the program is originally stored can also be found here. In particular, the subsection at the end of this section explains how to use the InstallPPaint program, which automatically copies all files which are necessary to work with Personal Paint to a destination selected by the user.

If Personal Paint is copied to another storage unit (e.g. another disk), some support files must also be copied (if not already present) to the new media. Personal Paint cannot work without these files:

FONTS:Personal.font, or PPaint:Fonts/Personal.font
 FONTS:Personal/8, or PPaint:Fonts/Personal/8
 PPaint:PP_Prefs/UIText.xxx

The following files are required only by certain functions (PPaint will load even if the files cannot be found):

PPaint:PP_Prefs/UIColors.num
 PPaint:PP_Prefs/Startup_x.set
 PPaint:PPaint_Icons_x/def_iconname
 PPaint:PPaint_PS
 CloantoAudio (root of disk), or DEVS:CloantoAudio



If Personal Paint cannot load the optional files, the program will load and work correctly, but some functions (PostScript output, audio, writing of icon files, etc.) will not be activated until the necessary devices can be loaded.



The "devs", "I" and "libs" drawers in Personal Paint's disk show which Amiga system modules are required by the program. By default, these are present in all versions of the operating system.

The "FF" (FastFonts) program can be put in the "c" drawer of the Workbench disk and used to speed up the display of text in the file requester and other parts of the user interface.

"FF" can be found on the original Commodore version 1.3 Workbench disk. The startup-sequence of the Personal Paint disk checks if the "FF" program exists and automatically uses it.

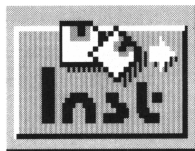
Section 1.11 explains how to inform the system and Personal Paint (by using Assign) about the new position of PPaint if the program and the other drawers and files are copied to a new disk or drawer.

Personal Paint and all the support material (pictures, fonts and data files) do not fit on a single 880 kbyte Amiga disk. For this reason, some drawers, like "PPaint_Prefs", appear both on the program disk (i.e. the disk on which Personal Paint is stored) and on the data disk(s), while drawers like "Pictures" are not present at all in the program disk. If Personal Paint is installed on a high capacity storage device, it may be

useful to merge the contents of drawers having the same name on different disks into a single drawer.

1.13.1 Automatic Installation: The InstallPPaint Program

The primary design goal of the InstallPPaint program was to make it as easy as possible for users of hard disks (under all versions of the operating system) to install Personal Paint on their high capacity storage devices. This makes it possible to use the programs which come with the package without loading them every time from the disks.

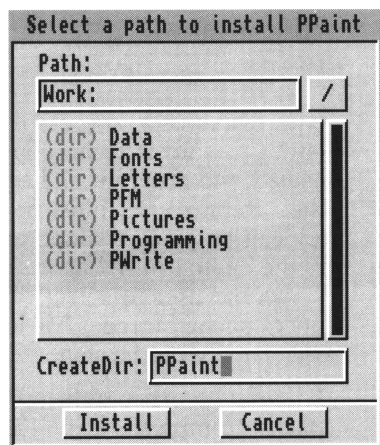


InstallPPaint asks the user to specify the device and/or drawer/s where the Personal Paint material is to be installed. The program can create a new drawer if necessary ("PPaint" would be a good standard name). This is recommended, as explained in section 1.11 ("Environment Variables and Standard Drawers").

The InstallPPaint program is written in the AmigaDOS command language, using several calls to small sub-programs created specifically for this purpose. (Other installation procedures exist, but these are not integrated in all versions of the operating system, and would not have fitted on Personal Paint's disk.) Experienced AmigaDOS users can load the "InstallPPaint" file with a text editor or a word processor and examine what the single commands do. The set of commands is executed automatically when the "InstallPPaint" Workbench icon is double-clicked.

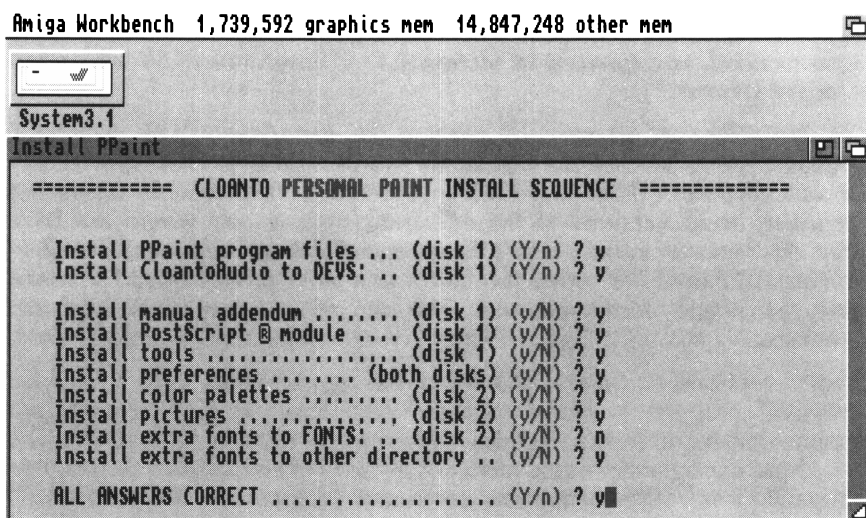
Several versions of AmigaDOS command replacements exist (e.g. ARP command programs). Many of these commands (e.g. Copy) do not recognize some options and codes which are peculiar to AmigaDOS. The install and configuration procedures of Personal Paint require the original AmigaDOS or 100% compatible command programs to run properly. If any problems arise, the replacement commands should be removed from the hard disk, and the original Commodore commands should be moved back into the "c" directory.

The first thing InstallPPaint does, is to ask where to install all the material. This is done using a file requester similar to the one described in section 3.4 ("The File Requester"). The "/" gadget is equivalent to the Parent option in Personal Paint's standard file requester. The right mouse button can be pressed to access logical, device and volume names. The main difference lies in the CreateDir text gadget



at the bottom of the requester, which can be used to specify a new drawer to be created. When a name is written in this gadget and <Return> is pressed, InstallPPaint creates a drawer (a directory with a Workbench icon) with the specified name. The content of the Path text gadget determines where the drawer is created. The name of the newly created drawer is added automatically to the path name. More than one drawer can be created in the same session. Section 9.1 ("AskAssign") describes another application based on the same file requester.

The Cancel gadget of the requester can be used to interrupt the install sequence. If the Install gadget is selected instead, the procedure continues, asking a series of very simple "Yes/No" questions about what should be installed.



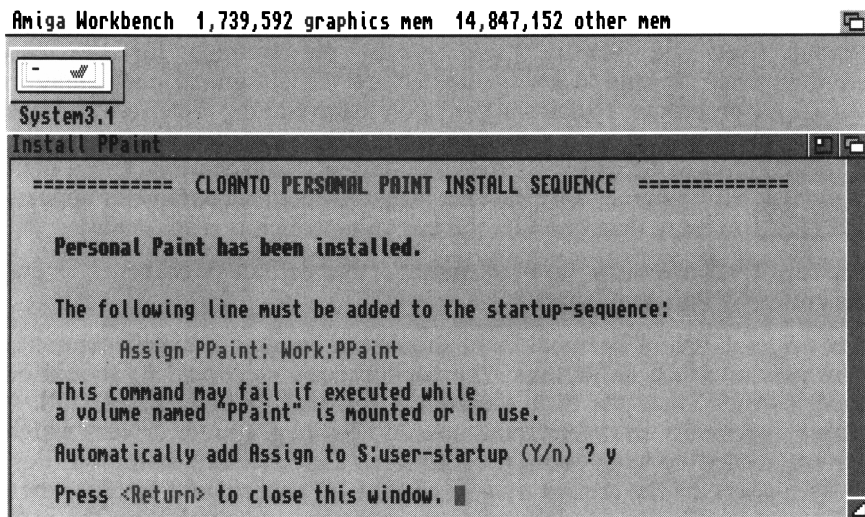
For example:

Install PPaint program files ... (Y/n) ?

requires the user to press the <Y> key if the file containing the Personal Paint program is to be copied to the new destination. If <N> is pressed instead, the program and the minimal set of support files are not copied. The <Return> key must be pressed to confirm the choice. The <Return> key can be pressed alone to select the default answer, which is indicated by the capital initial at the end of the question text. One of the questions allows the user to select (and create, if necessary) a drawer where extra fonts can be stored, if it is not desirable to copy them into the drawer associated with the standard "FONTS" logical device name.

By default, executable program modules are *compressed* to save disk space. Compressed modules may take more time to load than the

equivalent non-compressed code. In practice, the user may have to wait longer after double-clicking on the "PPaint" Workbench icon. If there is enough space on the hard disk, the decompression option of the installation procedure may be selected.



The installation procedure begins to install the specified files only after all questions have been answered. Short messages inform the user - step by step - about the actions which are being taken. The install sequence can still be interrupted at any time by pressing the <Ctrl>+<D> key combination, but this leaves the operation incomplete, and is therefore strongly discouraged. In such an event, the sequence can however be executed again by re-selecting the "InstallPPaint" Workbench icon.

1.14 External User Interface Files

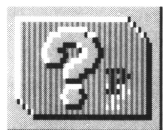
When Personal Paint is loaded, it checks inside the "PPaint:PP_Prefs" directory for some files describing the default program user interface texts, colors and the configuration of the two environments.

These files are: `UIText.xxx`, `UIColors.num` and `Startup_x.set`. The suffix after "UIText" indicates the language to which the texts and shortcuts refer ("eng", "deu", "ita", "custom", etc.) The number after "UIColors" indicates the color palette resolution of the video modes to which those colors refer (4 = 4-bit VGA, 12 = original chip set, 24 = Advanced Graphics Architecture, etc.) Generally, 12-bit color palettes are fine for all (old and new) video modes, except for 64-color ECS and A2024 modes.

The "UIColors" files contain an image to facilitate editing with Personal Paint. However, only the color map chunk of that IFF file is actually



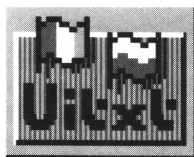
loaded and used at startup. For this purpose (and for saving disk space), the file may as well be generated with the "Save Palette" function (section 7.1.2). Saving the file as a brush is ideal for not exceeding the original file length. The file must be saved in the IFF-ILBM format.



Startup_1.set and Startup_2.set contain the settings for the two environments. Startup_A.set, generated by the automatic configuration procedure, contains information relative to the preferred language ("UIText" to be loaded, etc.). The files are loaded in the following order: Startup_A, Startup_2 and Startup_1. If a non-environment-specific (but program-relative) parameter appears in more than one file, the last value which is read prevails.

Section 1.9.5 explains how to modify the default Workbench icons generated by Personal Paint.

The original disk of Personal Paint should not be used to experiment with new user interface definitions. The backup copy (section 1.6) should be used instead. Since the disk containing Personal Paint is almost full, it may be necessary to delete some unused files (e.g. printer drivers which are not needed) to make room for additional user interface definition files. Novice users of the Amiga system should be particularly careful when selecting the files to be deleted or overwritten, and modifying the user interface of Personal Paint.



The user interface texts are displayed in menus, gadgets, requesters and other messages. Most of these texts are stored in special files on the disk which contains Personal Paint. The default user interface text file is automatically loaded with Personal Paint, while all files can be selected and loaded at any time as explained in section 8.10. Most interestingly, the files can be loaded, modified and saved again as plain text with any text editor or word processor (e.g. with the "Load Document" command of Personal Write). The keyboard shortcuts for the menu items are also stored in these files, and can be modified. If Personal Write is used to edit the text, the "TAB step" and "TABs in output file" File Format options must be set to 8 and Yes (or Auto), respectively. "Backup previous saved" should be disabled if data is written to a disk which is almost full.

A few very important rules must be followed to create a new file with the user interface texts. The easiest way to create such a file is to use an existing file as a point of departure. The file must be stored as a plain ASCII text file, without control sequences. TAB characters separating the shortcuts from the menu text must be preserved. Each line in the file must contain either one or more valid texts (separated with TABs), a comment, or no characters at all (blank line used as an optical separator). Leading

space and TAB characters are skipped. Comments begin with a ';' (ASCII decimal code 59) sign and end at the end of the line. Each line (including the last one) must terminate with a LF character (ASCII code 10).

An optional keyboard suffix may be written, enclosed between the "<>" (less than and greater than) signs and separated by one or more TABs, after each menu item text. The shortcut must be in the <Qualifier-Key> format. The qualifier field is optional. The qualifiers which are supported are: "Shift", "Alt", "Ctrl", "Amiga", and "Num" (numeric keypad). For example, "<Shift-Up>" would mean "this command should be executed by pressing the <Cursor Up> key while <Shift> is held down."

"Left", "Right", "Up" and "Down" are used to indicate the four cursor keys. Other textual representations include: "SP", "Tab", "BS", "Del", "Help", "Esc" and "F1" to "F10".

The keyboard shortcuts at the end of the file are associated to functions which have no menu-equivalent.

The texts should be designed and tested in such a way that all menus and requesters can be displayed in a low resolution screen 320 pixels wide and 200 lines tall. Message texts ("TMS" section of the file) which exceed the horizontal limit may be made "splittable" by inserting underscore characters ('_') where Personal Paint may bring the text to a new line, if necessary. Normally, these characters are automatically replaced with spaces.

When loading a file with new user interface texts (section 8.10), Personal Paint performs some simple length-checks and issues warning messages to indicate texts which are too long or should be made splittable. While this feature is useful for testing a file as it is being edited, the only guarantee that the file will actually work properly is to manually display all menus and requesters.

<Shift> should not be used as a qualifier for keys which already have a system-defined shifted representation (e.g., <Shift-a> is wrong, while <A> is correct). For commands which must remain accessible in a text editing session, only function key shortcuts and shortcuts having an <Amiga> key qualifier should be used. Other keys would be interpreted as a character to be typed, rather than a command to be executed.

Double assignments of the same shortcut should be avoided, as only one menu item can be associated with a key combination. <Ctrl> and <Alt> have special meanings in the Screen Grab function and in combination with the left mouse button. These local uses cannot be redefined.

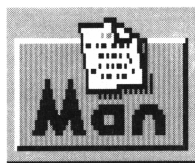
If only minor changes are applied to a file (e.g. only a few redefined shortcuts), the original file name can be maintained, overwriting the previous version (if that version is also stored somewhere else). If however a completely new and original version is developed, it may be advisable to use the "custom" suffix.



2. Tutorial

Thank you for choosing Personal Paint. Before you start working with the program, please make a work copy of the disks and put the originals in a safe place. Section 1.6 explains how to make a backup copy. Make sure that the original names are used for the new disks. If necessary, rename the copies (Workbench Rename command) to remove prefixes like "Copy of " (including leading and trailing space characters) which may have been added to the disk name by the copying program.

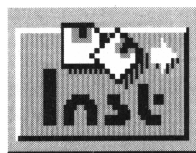
Don't forget to double-click on the PPaint.man icon on the program disk to read about possible recent additions to this manual. Different national versions of Personal Paint may be covered by different program registration policies. PPaint.man may contain more specific information on this topic.



Before installing the program, configure the program disk by double-clicking on the selected language-icon (English, Deutsch, Italiano, etc.) This procedure will move and rename some files on the disk, without deleting any data. The effects of this can be changed at any time by reconfiguring the disk. The disk must be write-enabled (the write-protect tab should cover the small hole on the corner of the disk). Section 1.12 contains more information on the configuration procedure.



Automatic hard disk installation is very simple, and is described in section 1.13.1. It can be activated by double-clicking on the InstallPPaint icon. It is possible to select where to install the program, to create a drawer if it does not exist already, and to decide which modules of the program to install. Installation and configuration may not work properly if incompatible AmigaDOS replacement programs have been installed (section 1.13.1 has more on command programs like the ARP tools).



If you don't have a hard disk, you might want to format one or more new disks and reserve them for data edited with Personal Paint. You should not save your work to Personal Paint's disks, since these are quite full. Also, do not overwrite or delete any existing files on these disks, unless this is done on copies of the disks. Generally, changing any such files in a

way which is not explicitly suggested in this manual may have undesired effects.

Once you start working with the program, remember to frequently save your work during each session, and make periodical backup copies of the entire disks. This will protect your work from mistakes, power failures, software errors and disk read/write problems.

2.1 Exploring Personal Paint

Personal Paint may be best explored by browsing through this manual and through the program user interface. The Table of Contents is very detailed and, like the manual, was designed in order to make things easy to find. Chapter 1 contains a general technical introduction to Personal Paint and the Amiga environment. Chapter 3 describes the main screen elements, while Chapters 4 to 8 are structured after the program menus. Chapters 9 and 10 are respectively dedicated to utilities and problem solving. Error messages, keyboard shortcuts and other details are described in the Appendices. Whenever something is not completely covered in one single section, or if there are related sections which may be of interest, there are explicit cross-references.

Since it is easier to study something after having already experimented a little bit with the subject, it may be useful to read the manual in more depth after having worked for some time with the program. Personal Paint is not dangerous to use: most program requesters can be displayed to see what they do, and terminated by selecting the Cancel gadget; painting and image processing operations can be undone; warning messages are displayed whenever there is a risk of overwriting or losing some data. Only remember never to work directly on the original program disks, use the copies instead.

The tools which appear on the bar on the left of the screen can be selected either with the left or the right mouse button, in their upper or lower half. The right mouse button usually activates an options requester associated with the tool. The upper and lower halves of the tool may be selected to specify the unfilled or filled mode. You should try out all tools in all possible combinations (left/right mouse button and upper/lower half).

Clicking with the right mouse button on the little number which appears among the predefined brushes pops up a little menu with numbers from one to nine. This means that up to nine different brushes can be used. The current number indicates which custom brush you want to use.

Most painting and image processing functions make use of the current foreground and background color. These can be selected from the palette which is displayed on the screen with the left and right mouse button, respectively.

Again, left and right mouse buttons have different effects when painting. The right mouse button usually clears the selected (or underlying) area using the background color.

If quality is preferred over speed, the Floyd-Steinberg Color Remapping and Color Average Resize should be activated and saved with the default settings (respectively sections 8.7, 8.15 and 8.2). If available RAM is very limited, you should close the Workbench screen, and use only one environment and a single brush (sections 8.16 and 10.1). Screen modes with higher resolution and more colors require proportionally more memory (sections 1.3.2, 4.5 and 4.11). If you don't know whether you have a lot of usable RAM, or just very little, check with the Memory Information command (section 4.11), and study the results after reading sections 1.3.2 and 10.1.

Before painting on a blank screen, you must choose an appropriate screen mode, page size and color palette (section 4.5). On Original and Enhanced Chip Set Amigas, low resolution screens (320 by 200) in 32 or 64 colors are normally preferred for paintings with plenty of colors. Higher resolutions limit the maximum number of colors, and are therefore used with palettes of up to 16 different colors. Advanced Graphics Architecture Amigas can work in up to 256 colors in most video modes. When you select a new screen mode with the requester described in section 4.5, don't forget to set the page size (usually the same as the screen size) and the maximum number of colors. Setting the highest possible values is not necessarily the best choice, especially if there is not much RAM to work with.

Personal Paint offers many original features which you might not expect to find in similar programs. You can start impressing image processing operations with a click on a tool (section 3.1.4), use the GIF file standard to read thousands of 256-color images which are available, grab screens from other Amiga programs (section 4.4), output to PostScript devices adding interesting effects (section 4.3.3), merge different images into one (and creating one common color palette - section 7.6), reduce the number of colors used by an image (section 7.7) and much, much more.

If you want to see some examples of what you can do by combining different operations, just go on and read the following sections.

2.2 Gradient Fill

This example will show you what you can do with Personal Paint's special fill and line modes.

Choose a high resolution screen format with 16 colors (Project/Image Format menu - section 4.5). A standard PAL or NTSC high resolution mode will do. If you are not annoyed by interlace mode, select an

interlaced screen.

Display the color palette requester (Color/Edit Palette menu - section 7.1.3). The requester also appears if you press <p>. Click on the first color in the row of colors displayed at the top of the requester. Make that color white by setting the R, G and B sliders appropriately (all sliders to the right). If white looks too bright on your monitor, move the Brightness knob to 80% to obtain a light gray. Then go to the second color and make it black (the three sliders should be moved to the extreme left). Now pick the next color (color position 02) and make it dark green (set H, S and B respectively to 137, 100 and 46). Jump to position 08 and set that color to light green (HSB = 82, 61, 86). Set color 09 to dark red (HSB = 0, 100, 66) and color 15 to pink (HSB = 11, 33, 100).

Now you need to create the intermediate shades of green and red. To do so, click on dark green, select Create HSV Range (the gadget with a II over the range symbol - section 7.1.3.6), and click on light green. Now there should be a smooth transition of colors between dark green and light green. Repeat the process with red: select dark red, click on the Create Range gadget and then select pink. If everything goes well, you can select Proceed, to confirm the changes. Otherwise, repeat the above steps.

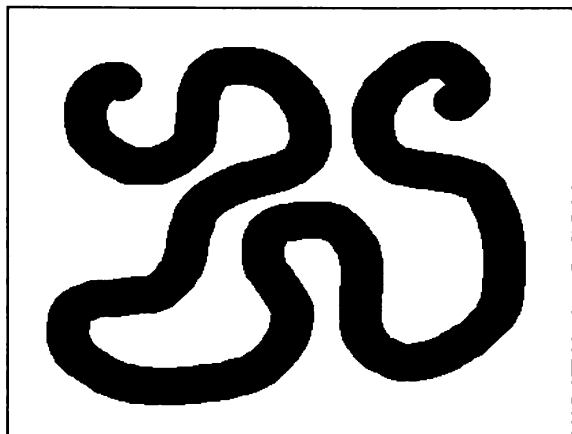
In the color palette below the tool bar, click on black with the left mouse button, and on white (or gray) with the right button. This will set the foreground and background colors. Clear the image, if it is not already empty, by selecting the Clear tool (section 3.1.9).

Select the smallest predefined brush (the first). You may also do this by typing <.> on the keyboard. Select the Empty Rectangle tool by clicking on the top half of the rectangle image with the left mouse button. Draw a large box, almost as large as the screen, by clicking and dragging with the

left mouse button. If the box does not look like you would like it to, select the Undo tool (section 3.1.10), or type <u>.

Pick the largest of the round brushes. Make it even larger by typing <+> half a dozen times (use the plus sign which appears on the alphanumeric keyboard, not the one on the numeric keypad).

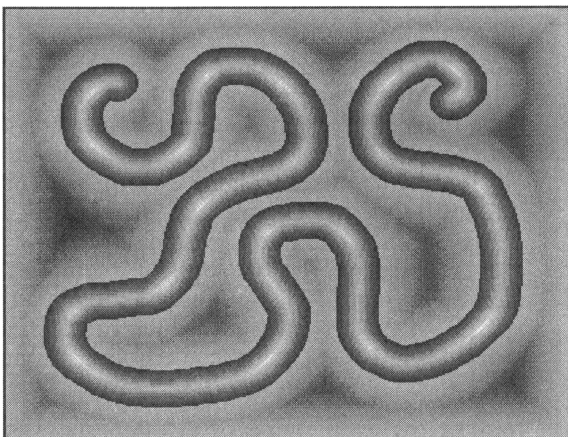
Select the continuous freehand drawing mode by clicking



on the top half of the tool with the left mouse button. Move the pointer inside the box which you have created, click on the left mouse button and move the mouse to draw something like a snail, a worm, or an S-like shape. Release the mouse button when you have finished. Again, select Undo if you would like to try again.

Now click on the fill tool using the right mouse button. The Area Settings requester should appear. Select the Manual Gradient Mode (section 3.1.2.2.2) by clicking on the Gradient Mode symbol until the four boxes crossed by an arrow appear. Click on the Gradient Type gadget until the Shape symbol is selected (a circle containing four arrows should appear). If you see the correct symbols, select Proceed. The Gradient Fill symbol should appear on the title bar.

Now select pink as the foreground color, and dark red as the background color (by respectively selecting the colors in the palette with the left and right mouse button). Move the mouse pointer over any point which is inside the box, but not over the curved shape. The mouse pointer should be displayed using the Fill symbol. Click on the left mouse button. This will take a few seconds. The background of the box should be filled with smooth shades of green. Now select light green (it should be just over red in the palette) and dark green as the foreground and background color. Fill the black shape inside the box as you have just done for the background. You should now see something like a green snail lying on a red cushion. If you wish, you can obtain different variations by exchanging red and green, or light and dark colors.



If you want to experiment more applying the same techniques, you can select the Filled Freehand tool (use the left mouse button to click on the lower half of the gadget) and draw a heart-like shape. The heart will be softly shaded using the colors from the current foreground to the background color.

Did you expect that you could create similar effects with Personal Paint and just a few mouse clicks? If you are looking for more surprises, just go on reading.

2.3 Line Pattern

For this short example you can use the same screen, image format and colors of the previous example. You will see how you can draw lines composed of color cycles from a sequence of palette colors.

Select white (or gray) as the current background color (right mouse button) and clear the image with the Clear tool.

Click on the Filled Rectangle tool (lower half of the rectangle image) using the right mouse button. This will display the Area Settings requester. Click on the Gradient Type gadget until the Horizontal Gradient symbol appears (a two-headed arrow completely contained in a circle). While the requester is displayed, you can choose some colors in the screen color palette. Select dark red as the foreground color (use the left mouse button) and pink as the background color (right mouse button). You will see how the Gradient box changes to show a smooth transition of red. Select Proceed.

Paint a long, horizontal filled rectangle by dragging the mouse on the screen (left mouse button held down). It should automatically be filled with the colors from dark red to pink. Now click once on the Define Brush tool. Select a horizontal stripe inside the rectangle which contains all gradations of red. Then click on the Line tool using the right mouse button. The Line Settings requester will appear. Cycle the Line Type gadget until Colored Pattern appears. Then click on the gadget corresponding to the first brush (assuming that this is the brush you have already defined). This will create a line pattern which uses the colors that appear on the topmost line of the brush. Click on Proceed to remove the requester. The Line Pattern symbol will appear on the title bar.

Now select the large, round, predefined brush, and start drawing some lines or freehand curves of different lengths. You will notice that the path is made up of all the colors in the range which was originally enclosed by the brush. You may try several variations by redefining the color palette with different color spreads. By selecting the shaded brush, applying Brush/Rotate/Horizontal Flip and pasting the new brush to the left or right of the original pattern, you can create "ping-pong" color transitions (with colors softly changing back and forth).

2.4 Combining Text Editing, Image Processing and Stencils

You could start this session using the same screen mode, page size and color palette selected for the previous examples.

Select light green as the current background color (right mouse button) and clear the image with the Clear tool.

Click on the Text tool (section 3.1.3) with the right mouse button. This will display the Font Selection requester. If you have many fonts, it will take the operating system a few seconds to scan through all of them. Personal Paint will then show you all the fonts which are available. Click on "Topaz 9 oetf". This is a standard ROM-font which should be available on all systems. (If you have a better font, use it.) In the Font Attributes text gadget, change the 9 to 20, append an 's' after the other characters and press <Return>. If you have version 2.0, or a higher version of the operating system, you should now see an enlarged version of the Topaz font. Click on Proceed.

Select black as the foreground color, move the cursor to the center of the screen and type a short sentence. Now use the right mouse button to select the Image Processing tool (section 3.1.4). Double-click on Blur Low. The requester should disappear.



By dragging the mouse while the left mouse button is held down, select an area of the screen which is sufficiently large to contain the text you have just typed, with a margin of several dozen pixels. Line by line, you should see the text being "blurred". This effect is useful if you want to *anti-alias* a text typed with a font which has visible "steps", or to smoothly merge a text with the background.



Now let's try again, but blurring the pixels which make up the text without affecting the background. Select Undo to cancel the effects of applying image processing to the text. Select the Edit Stencil requester. Put a checkmark on the light green box by clicking on it. Select Proceed. The Stencil Mode symbol should appear on the title bar. Select Blur High after clicking on the Image Processing tool with the right mouse button.

Apply image processing again by redefining the area to be processed. The background should remain intact, while blurring should change the outer parts of the characters, making them look a bit like oxidized copper.

Try another text color: select dark red and click on the Filled Rectangle tool (left mouse button, lower half of the rectangle). Since the background color is still "protected" by the stencil, you can change the text by painting a rectangle over it. Try blurring again. Then disable the stencil by typing <'> on the upper left of the keyboard: the stencil symbol should disappear from the title bar.



Now you can repeat all of the above combinations using different text and background colors, changing some colors in the palette, applying different effects (like Blur High, Randomize High, etc.), activating the F-S Error Diffusion option in the Filter Selection requester, etc. You can use the



stencil to protect the text color instead of the background color (in this way, you could quickly recolor the background without modifying the text).

2.5 Color Reduction and Remapping

This example will show you the differences between qualitative and quantitative color reduction, and different types of color remapping. The "Parrot.gif" and "Clown.gif" picture files are used in this section. These files are part of a collection of pictures which is available for use with Personal Paint. Check on the disks which come with the program. If you don't have these files, you may use other pictures having the same format, or contact your Amiga dealer. The single images are also available from public domain sources.

If your Amiga employs the Original or Enhanced Chip Set, you do not need to set the screen size before loading the images used for these examples. If you have an Advanced Graphics Architecture Amiga, or any other Display Database-compatible device capable of displaying 256 colors, you must set the screen and image format to 320 by 200 (LowRes HBrite, PAL or NTSC), 64 colors. If you are using a PAL screen, or any other screen having a different size, remember to manually set the image size to the 320 by 200 image format. You should not set more than 64 colors, otherwise you won't be able to appreciate Personal Paint's color reduction and remapping applied to 256-color images.

Make sure that Settings/Color Reduction is set to Qualitative and Settings/Color Remapping is set to Simple (sections 8.6 and 8.7).

Select Project/Load Image (section 4.1) and choose the file named "Parrot.gif". (On the data disks which are designed for use with Personal Paint, picture files are stored in the "Pictures" directory.) Double-click on the file name, or select Proceed to load the image.

A warning requester might appear, indicating that the selected image has a format and number of colors different from the current environment format. If you have been working with an AA (256-color) system, and have manually set the screen format as explained before, select the lower gadget to maintain the current format (the Stretch option should be disabled). If you have an Original or Enhanced Chip Set Amiga, just click on Proceed, leaving the default gadget selection unchanged. This will activate the screen mode which most closely matches the format of the selected image, i.e. Low Resolution HBrite.

The progress requester keeps you informed about the current status of loading and converting the image. The time it takes also depends on the color remapping mode and the number of colors (if the screen can display all image colors, there is no need to color-reduce and remap).

The parrot image should appear on the screen. Select Project/Environment/Copy to Other, followed by Project/Environment/Switch (or press <j> on the keyboard). This will create a second environment, identical to the first one. You will notice that you are in the second environment from the "2:" which precedes the name of the picture on the title bar.

Now change the Settings/Color Reduction option and choose Quantitative. To see the difference between the two modes, you can now load the same image again, repeating the same selection on the warning requester. After the usual progress indications, a second parrot will appear. Can you notice the difference at first glance? Look at the tail, and press <j> to switch from one environment to the other: the first parrot has a blue tail, while the second parrot has a gray tail.

Blue shades were used very little in that image, but were important to render details like the tail. The qualitative color reduction method respects these priorities. The quantitative method, on the other hand, tends to preserve more shades of similar colors, as you can see if you observe the branches of the trees.

Now we'll do another experiment to understand the difference between different methods of color remapping. Leave both images as they are. Reset the Color Reduction to Qualitative. Start from any environment, and load the "Clown.gif" picture. Reply to the program messages as you did before.

Now press <j> to go to the other environment. The parrot should still be there. Select Floyd-Steinberg in the Settings/Color Remapping menu, and load "Clown.gif". Now both environments contain the image of a clown. Again, can you spot the difference? Look at the nose of the clown and press <j> a few times. Floyd-Steinberg color remapping has created much smoother color transitions, giving the illusion of a larger color palette by carefully combining different colors.



2.6 Color Merge

This example will require considerably more Chip RAM, and might not work on 1 Mbyte systems. It will show you how to merge the color palettes of different images into a common palette, so that different images can be viewed, overlapped and freely mixed on the same screen.

Four different images will be required. If you can spend more time on this, select images which have different color palettes (both in the number

of color entries, and in the colors themselves), but were designed for the same screen format. If all the source images have the same format, you can create a simple poster without having to resize each image in a different way. You should be able to create something like the "PPaint.gif" sample file, where each image occupies a quarter of the screen.

If you have selected images with a particular format, then select the same format for the screen and image (Project/Image Format menu). The Color Merge process merges different palettes into a new palette which has the same number of colors as the current environment. For this reason, an image format with at least 16 colors should be set for higher quality results.

Now select brush number one. You can do this either by typing <1> on the numerical keypad (not on the alphanumeric keyboard), or from the menu which appears when you click with the right mouse button on the little number among the predefined brushes, on the tool bar.

Use Brush/Load (section 5.1) to load the first of the four pictures. Then select the following brush number and repeat the process until you have four images, each associated to one brush. Don't be surprised if the brushes are not displayed with their correct colors. This is caused by the fact that the screen (i.e. the current environment) may probably use a different set of colors from the brush. Also, don't worry if you are using Load Brush instead of Load Image: you need to do this to be able to process different images at the same time. If you wanted to merge only two pictures, you could use Personal Paint's two image environments.

Choose the Color/Merge menu item (section 7.6). In the requester, click on the items which you want to merge. In this example, it should be sufficient to click on the gadgets associated to the first four brushes. If the gadgets are shadowed, you probably forgot to change the brush number before loading a new brush. Select Proceed to see Color Merge in action.

If you didn't select Current in the merge requester, you have to select Color/Palette/From Brush to apply the brush palette to the current environment. Now you can cycle through all of the brushes to resize them. This time, as each brush is selected, it is also displayed properly on the screen. If you notice that a brush is deformed, i.e. it is too tall, or too wide, apply Halve Vertical or Halve Horizontal. Otherwise, if the brush is simply too large, select Halve from the Brush/Resize menu.

Now you have four brushes which are small enough to be manipulated and combined on the screen. For most Amiga users with some graphics experience who see four completely different pictures on the same screen, it is a surprise to discover how few colors need be used. Paste the brushes on the screen to create an image like "PPaint.gif", or "ColorMerge.gif".

You could apply some variations to the process described here. For example, you could activate the Color Average Resize option in the Settings menu (section 8.15). This would considerably slow down resizing operations, but would also improve the quality of brush resizing. Alternatively, you could set the Color Remapping option to Floyd-Steinberg. In that case, however, you would have to first resize the images, and then execute the color merge. Otherwise, resizing the brushes would alter the Floyd-Steinberg patterns created by the color merge and remapping process.

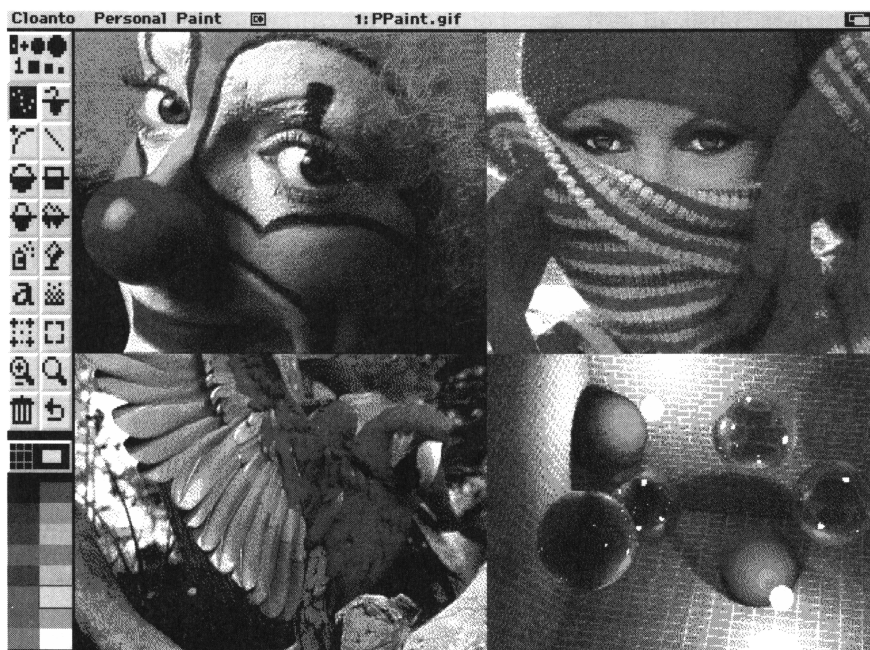
If you want to save the image, use Project/Save Image. When choosing the file format, keep in mind that GIF files generally occupy less space than other formats, whereas IFF-ILBM is the standard which will allow you to exchange data with most other Amiga software. If you like special effects on your Workbench, you may want to use colored picture-icons. Section 8.9.2 explains how to use icons representing reduced images in up to 256 colors.

To conclude this example, click on <F9> to hide the tool bar with the color palette. Then look at the screen: can you remember how many colors you used?



3. The Screen

The main window of Personal Paint, the requesters associated with painting tools and the file requester are among the most used graphical environments in the program. This chapter describes the functions which can be accessed from these windows. Other windows and requesters, associated with specific settings or functions, are described in chapters 4 to 7.



3.1 The Tool Bar

The most used program functions can be accessed directly by clicking one of the gadgets contained in the *tool bar*. For faster access, the tool bar is located on the left of the screen, just like the default position of images,

Amiga Workbench volume icons and the image coordinate system (which all start from the top left of the screen).

The <F9> function key may be used to alternately remove and redisplay the tool bar. In combination with <F10>, which is used to remove the title bar, this command makes it possible to use a larger portion of the screen to actually see and modify the image.

All gadgets can be accessed with a single mouse click, but give different results depending on which mouse button is used, and, in some painting tools, whether the mouse pointer is over the upper or lower half of the gadget. Clicking the left mouse button immediately selects the function associated with that gadget, while a click on the right mouse button displays a requester with different program options of that particular tool.

Any operation performed with a tool may be undone by clicking on the Undo gadget (section 3.1.10) immediately after the tool action is performed.

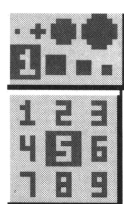
Appendix B lists all keyboard shortcuts to the different tools.

3.1.1 Default and Custom Brushes

Whenever a dot, a line or a more complex pattern is drawn on the screen, the program uses the current brush as if it were its "drawing pen". A brush is a small image. Selecting the smallest, pixel sized, brush, is like using a very fine pencil, with which each pixel on the screen can be modified individually. This is the default brush. Working with other brushes is like using thicker tools of different shapes, like a fountain pen, a piece of chalk, etc.



The two topmost rows in the tool bar contain brushes of different sizes. There are round brushes, square brushes and brushes which can be user-defined. A brush can be selected with the left mouse button. Using the right mouse button, on the contrary, activates the brush stretch mode (section 5.10.1). This means that the size of the selected brush can be changed manually by moving the mouse on the drawing area while the left mouse button is pressed. In this way, it is also possible to produce elliptical or rectangular brushes. The <+>/<-> (plus/minus sign) key shortcuts can be used to increase or decrease the size of the brush without leaving the keyboard.



A small number, at the beginning of the second row of brush symbols, indicates a previously defined *custom brush*. Section 3.1.6 explains how to define such a brush. Clicking on the number with the left mouse button selects that brush, just like the other brushes, while the right mouse button activates a small *pop-up* menu, where it is possible to select the current custom brush among nine different brushes. Once a brush number has been

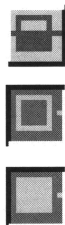
chosen, that brush is used for all paint and brush selection operations. Whenever a different custom brush is selected, the other brushes are preserved intact for future use, and can be reselected at any time. Undefined (empty) custom brushes appear as dot-brushes.

It may sometimes happen that a drawing command yields no apparent result. For example, one may wish to draw a line, or paint a dot, but nothing on the screen seems to change. This usually means that the current combination of brush colors and paint mode was chosen to give exactly that result. For example, a brush containing an image entirely drawn in the background color, may become invisible (transparent) in the Matte paint mode (section 5.7.1). If this occurs, it is sufficient to change paint mode (section 5.7), or select/define another brush.

Chapter 5 is entirely dedicated to brushes, with a detailed description of Personal Paint's original brush handling functions. Section 3.1.6 describes how to define a custom brush. Section 7.6 explains how to merge the color palettes of different brushes into a single, common, palette. Section 7.1.7 describes how to use the brush's palette for the current image.

3.1.2 The Painting Tools

Some tools can be used to either draw an outline or a filled shape (e.g. a rectangle, or circle). The symbols used for these tools are divided into two halves: the upper half of the gadget is used to select the outline function, and the bottom part for the fill mode. Pressing the left mouse button activates the selected drawing mode, whereas the right mouse button usually activates a requester with several options associated with the tool. The upper/lower half distinction also applies to right mouse button selections: different requesters (e.g. line vs. area settings) may be associated with each half of the gadget.



If the <Shift> key is held down during a painting operation, the tool can be positioned only vertically or horizontally, i.e. in the direction the mouse pointer is first moved after pressing <Shift>.

3.1.2.1 Dotted Freehand

This is the simplest painting tool. When it is active, the current brush is used to "paint on the screen" whenever the left or right mouse button is pressed. If the left button is pressed, the brush is "pasted" onto the image. The resulting color and shape also depend on the current paint mode (section 5.7), stencil (section 7.2) and transparency (sections 5.8.5 and 8.14). If the right mouse button is pressed, the brush is drawn using the current background color.



The foreground and background colors can be selected from the palette

below the tool bar with the left and right mouse buttons, respectively, as explained in section 3.1.11.

If the mouse is moved quickly while a button is held down, several "dots" are painted. The distance between the dots depends on the speed at which the mouse is moved, as well as the computer's processing power. A faster computer will be more efficient at "catching up" with the mouse pointer. Personal Paint does not try to reconstruct the mouse's path. A separate function is provided for this purpose, as described in the following section.

3.1.2.2 Continuous Freehand

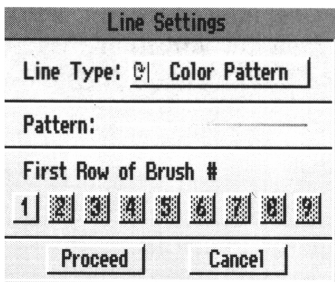
This tool is similar to Dotted Freehand, but paints continuously along a path, rather than individual dots. The upper half of the gadget can be selected to draw the simple path, while selecting the lower half causes the path to be filled.



If the right mouse button is used to select the upper half of the gadget, the Line Settings requester appears, while the Area Settings requester is displayed if the lower part is selected. These two requesters can be selected and used in the same way in the Curve, Straight Line, Circle, Rectangle, Ellipse and Polygon tools. The two program environments (section 4.8) have independent Line and Area Settings.

3.1.2.2.1 Line Settings

The Continuous option in the requester is the default operating mode of Personal Paint: straight lines, borders and arcs are drawn continuously. The On-Off and Color Pattern gadgets, on the contrary, allow for some special effects: if a brush is selected, the pixels of its first (horizontal) row determine the spacing ("pattern") of consecutive brush strokes.



In On-Off mode, Beginning on the left of the row, pixels having the background color are interpreted as "don't paint", while non-background colored pixels count as "paint".

For example, assuming green as the current background color, a brush having a continuous row of red dots as its first line would have the same effect as selecting the Continuous option, whereas a straight line of green dots would prevent the program from painting at all.

The other mode, Color Pattern, is useful for drawing multicolored lines in the Color brush paint mode. The individual colors of the pixels in the first row of the brush determine the actual colors used to draw lines. In the previous example, red would mean "paint in red", and green "paint in

green".

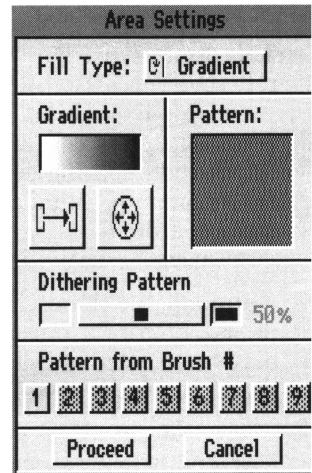
After the line pattern has been defined, it becomes independent from the brush. This means that the same brush can be redefined without altering the line pattern.

3.1.2.2.2 Area Settings

Just as Line Settings allows for some additional freedom in line drawing details, the Area Settings option determines how solid shapes are to be drawn and/or filled.

The default Fill Type is Solid: the entire surface is painted with the current foreground or background color, depending on the mouse button which was clicked to start the paint operation.

In Gradient mode, the color of filled shapes changes smoothly from the background color to the foreground color. The background and foreground colors (gradient start and stop) can be selected using the right and left mouse buttons to pick a color from the palette. This can also be done while the requester is displayed.



Two gadgets give additional control over the gradient fill mode. The left gadgets toggles between Manual and Automatic gradient modes. In manual mode, all colors which appear in the palette range between the background color and the foreground color are used, in the same order as they appear in the palette. In automatic mode, Personal Paint calculates the smoothest transition from the background color to the foreground color, mixing different colors of the palette as appropriate. The right gadget selects the gradient type, i.e. the direction (vertical or horizontal) in which to apply the color transition on the screen, and the start and stop positions for the color range. The types are: Horizontal (based on the width of the object to be filled), Horizontal Image (based on the width of the entire image), Vertical (considers the height of the object to be filled), Vertical Image (uses the entire image's height) and Shape (starts from the outer borders of the shape to be filled, and goes inwards).

The third fill mode is the Pattern fill. A constant pattern is repeated over the entire fill area. The pattern can either be dithered (using any two colors), or selected from one of the custom brushes. In the first case, the two colors, shown in a pair of boxes, may be selected with the mouse from the image or the palette (like the background and foreground colors). A slider indicates the percentage of the second color in the

pattern.

When gradient rendering is actually performed on the screen (e.g. using the fill tool), it can be aborted by pressing any key on the keyboard. If this is done, the image is not modified by the fill operation, unless Undo (section 3.1.10) is also selected.

3.1.2.3 Curve



This tool is used to draw curves which can be bent by moving four reference points with the mouse. When the tool is selected, the initial, straight, line skeleton is defined by clicking a mouse button (left or right, to give a foreground or background colored curve), drawing the line, and releasing the button. The four control points appear as marks at the beginning, middle and end of the curve, and can be grabbed and moved around using the left mouse button. The right mouse button terminates the definition of the curve.

Normally, the point closest to the mouse pointer is grabbed when the left mouse button is pressed. If the points are difficult to distinguish, they may be selected individually by pressing a key from <F1> to <F4> before the left mouse button is pressed.

The exact definition of this type of curve is "Bézier cubic section". The four points geometrically define the shape of the curve. The curve starts at the first point, at a tangent to the line from the first to the second point, and ends at the fourth point, at a tangent to the line which joins the last two points. The curve is always enclosed by the convex quadrilateral defined by the points.

3.1.2.4 Straight Line



This tool is used to draw simple, straight lines, using the current brush as specified by the line settings. After selecting the tool, the left or right mouse button can be pressed when the pointer is at the desired starting position of the line. While the button is pressed, the mouse can be moved to where the line should end. Releasing the mouse button confirms the line as it appears.

The <Shift> key can be used to draw perfectly vertical or horizontal lines.

3.1.2.5 Circle



This tool is used to paint outlined or filled circles. The current brush is used as the "pen", and the line and fill type options (sections 3.1.2.2.1 and 3.1.2.2.2) are applied.

The upper half of the gadget selects the outlined circle, while the lower half activates the filled circle. The center of the circle is selected when the

mouse button (as usual, left button = foreground color, right button = background color) is pressed. While the button is held down, the mouse can be dragged to indicate the size of the circle. Finally, releasing the button confirms the circle as it is displayed.

As with all other painting tools which may affect non-visible parts of the image, the Clip Graphics option (section 8.13) determines whether parts of the circle which extend beyond the visible screen area should be drawn or not.

3.1.2.6 Rectangle

This tool produces a rectangle, which can either be filled or drawn as a border. The size and shape of the rectangle can be selected by dragging the mouse while the background/foreground color button is held down.



3.1.2.7 Ellipse

This tool is similar to Circle and Rectangle, except that an outlined or filled ellipse is painted instead. As with the other tools, the <Shift> key can be used to restrict the mouse to moving along the vertical or horizontal axis (section 3.1.2). Similarly, different options requesters (line and fill type) are displayed if the gadget is selected with the right mouse button.



3.1.2.8 Polygon

If the upper half of this gadget is selected, the tool behaves like a straight line tool which automatically concatenates lines, thus creating polygonal shapes. After the first corner of the polygon (i.e. set of joined lines) is set by clicking on the left or right mouse button, successive mouse button actions define additional corners. The polygon can be closed by setting a corner next to the origin, or pressing the <Space> bar. The outlined polygon does not need to be closed: it can be terminated by selecting any painting tool.



If the lower half of the gadget is selected, the polygon is filled after it is closed.

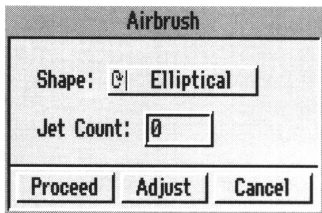
3.1.2.9 Airbrush

This is the equivalent of the "real world" airbrush. The painting area is "sprayed" over using the current brush. The background color is used if the right mouse button is selected.



Clicking on the Airbrush gadget with the right mouse button displays the Airbrush options.

The Shape option is used to select either an elliptical or rectangular airbrush shape. The ratio and size of the ellipse or rectangle can be set manually after selecting the Adjust gadget. This works just like resizing the default brushes (section 5.10.1).



The Jet Count value (which has a valid range from -20 to 1000) indicates the minimum number of "jets" rendered at each mouse movement. A value of zero indicates the default mode (continuous airbrush mode). Positive

values may be used to obtain smoother shades (the number of "jets" remains constant, even if the pointer remains still for a long time). If the value is negative, it indicates the delay (in sec/50) between consecutive "jets".

Each of the two environments (section 4.8) may have its own, different airbrush settings.

3.1.2.10 Fill

This tool fills the painting area starting from the mouse pointer position. The specified color (or pattern) spreads to all areas contiguous to the color clicked on. Beautiful effects can be obtained by changing the default Solid fill mode to a more sophisticated one, as described in section 3.1.2.2.2. The Fill Type requester appears when the Fill gadget is selected with the right mouse button.



The fill operation may be interrupted by pressing any key. In this case, the image remains unaffected by the fill command. Selecting Undo after the operation is aborted restores the partial fill.

The area to be filled may extend beyond the visible screen limits. The Clip Graphics menu option determines whether the paint command may affect off-screen areas or not.

3.1.3 Text

Selecting this tool with the left mouse button activates the Text Editor: the text cursor can be positioned anywhere on the painting area, where it becomes possible to write using the keyboard. The Font Requester is displayed if the tool is selected with the right mouse button (section 3.1.3.2).



3.1.3.1 The Text Editor

The text editing mode begins as soon as the cursor is positioned over the desired spot using the left mouse button. As an aid for exact positioning, the cursor is displayed as a character-sized box, with a horizontal line

indicating the baseline. The cursor becomes a flashing bar when writing. During writing, the cursor can be repositioned using the left mouse button, whereas the right mouse button can be used to "grab" and move the entire text just written.

The text is treated as a stream of editable characters as long as the text editor remains active and the cursor is not repositioned by using the mouse. After that, the text is "pasted" onto the painting area, and cannot be repositioned or modified with the text editor. It can, however, always be modified using the ordinary paint tools.

Personal Paint accepts the standard keys handled by Amiga text editing tools: cursor keys (unshifted or shifted) to move around, <Return> to begin a new line, <Backspace> to change the character to the left of the cursor, <Del> to delete the current character, <Amiga>+<v> to paste text from the clipboard, etc. Chapter 6 describes in more detail the functions of the Text menu.

During editing, it is possible to select a new color from the palette or a new font using the font requester. The entire text can be dragged, using the right mouse button, without interrupting the editing mode. Pressing <Esc>, or selecting a new tool, terminates the editing session.

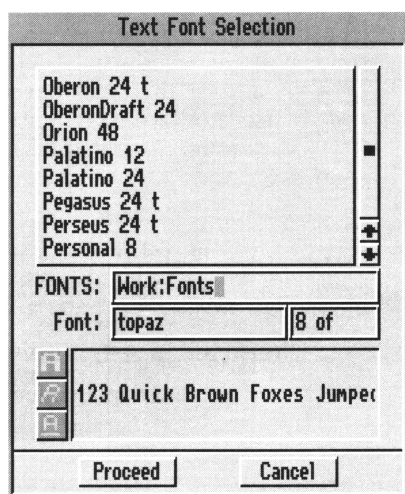
Personal Paint implements many more text processing functions than other paint programs. Although it is an advanced and complete package, it was not designed to cover word processing requirements. Cloanto's *Personal Write* is an affordable, fast word processor packed with powerful and original functions.

3.1.3.2 The Font Requester

The font requester is used to select the font to be used for text rendering functions. If a new font is selected during text editing, the current session is terminated and a new session, using the selected font, begins at the cursor position.

A *font* is the collection of all the various characters and symbols of a particular type design in a particular size. Fonts may consist of very few special signs, the basic alphabet or even several hundreds of characters.

Amiga fonts can be either *monochrome* or *color* fonts, and are stored in *bitmap* or *vector* format. Vector fonts are more easily scaled to different sizes than bitmap fonts. Bitmap fonts, on the other hand, are generally



hand tuned for better results and look better at smaller sizes. Personal Paint can load, scale and use all of these fonts. Font scaling and color fonts have become widely available with version 2 of the Amiga operating system.

The font requester is quite similar to Personal Paint's standard file requester (section 3.4). There is a list of fonts which can be selected using the mouse. A string gadget to the right of the name of the selected font indicates that font's size and attributes. A small window displays some sample text written using the selected font (it is possible to modify the sample text by editing the user interface text file - section 1.14).

The names of the default system fonts (e.g. ROM fonts like "topaz 8 of" and "topaz 9 oetf") may appear even if the specified "Fonts" directory does not contain any font files, as these fonts are always available and usually stored in ROM. The names of already used fonts may also appear, if their bitmaps are still in some system buffers.

The font name can be selected with the mouse from the list box. This automatically causes the desired size and style to be selected as well. It is also possible to manually enter this information in the string gadget on the right. This can be particularly useful if no font bitmap file exists for a particular font size and style. If the requested font size does not exist, the Amiga operating system either scales the font to the desired format (in version 2.0 and beyond, only if the "Scaled Font" attribute is specified), or loads the closest existing font. The result of scaling a font to a new format is usually better if the point of departure is a vector font.

The three gadgets to the left of the font sample are associated with the bold, italic and underlined attributes. If the selected font is vector-based, or a version of that font having the specified attributes exists, then that font is used, otherwise the style is algorithmically generated (*soft style*). Style variations may also be selected during text editing, as explained in section 6.5.

The remaining font attributes are appended to the number indicating the size of the font, following a widespread Amiga standard. One lower case character is associated with each of the Amiga font attributes. The characters are:

Character	Attribute
u	Underlined (no soft style)
b	Bold (no soft style)
i	Italic (no soft style)
e	Expanded
r	Right to Left
f	Fixed Pitch
t	Tall Dots

Character	Attribute
w	Wide Dots
c	Color Font
o	ROM Font
s	Scaled Font
v	Vector Font

It may sometimes happen that no custom-designed font bitmap exactly matches a particular font name, style and size. The font handling routines can algorithmically modify an existing font in order to build a font with the desired format. A font generated by such a procedure is flagged with the "Scaled Font" attribute. If it is desirable to build a font in a particular size, rather than using the closest match, an 's' must be appended to the number indicating the size, to enable scaling.

For example, if "topaz" and "20 sib" are typed in the Font string gadgets, a stretched ('s'), 20 pixels high, version of the Topaz font is selected, and the Italic ('i') and Bold ('b') soft styles are applied to it. The style gadgets are automatically updated (they could be used to select "Italic Bold" instead of typing "ib").

A particular font may look differently depending on the display mode. For example, it may look "crushed" on an interlaced screen. Starting with version 2 of the Amiga operating system, the 's' option also takes into consideration the current display ratio. For example, a 2:1 pixel ratio would be applied to a "CGTriumvirate 40 s" font in a Hires-NonLaced screen. If Personal Paint's screen mode is changed (e.g. after an environment switch), the ratio of any used vector font is also updated whenever the text tool is (re)selected, or the font requester displayed.

The "Vector Font" flag is used to immediately recognize vector font files.

When a color font is selected, the displayed sample may not give an exact representation of the original colors, e.g. if the current screen format does not support the font's number of colors. After selecting the font, it is still possible to change the screen format (section 4.5). The font's color palette can also be restored at any time (section 7.1.8).

Well-written font applications which add or modify Amiga font data automatically update the description of the fonts available for that typeface, which are stored in separate system files. Unfortunately, some programs do not update these information files, so it sometimes happens that these files do not describe the fonts which are really available any more. The Commodore FixFonts program was designed to solve this problem (it can be started by typing "FixFonts" in the Shell). FixFonts should also be used if any font files are renamed, moved, deleted or copied manually using the Amiga Workbench or Shell.

Cloanto has dedicated an entire book and a collection of software tools to

fonts and their Amiga and printer applications. Cloanto's *Personal Fonts Maker* package is a complete environment for any user who wants to study and manipulate fonts and interact with other software, or even download fonts directly to the printer.

3.1.4 Image Processing

This tool is used to select, edit and apply programmable transformation processes (*filters*) to parts of the picture. With this function it is possible to select with precision the area to be modified. It complements the functions which can be performed on the entire image or brush (sections 4.6 and 5.4).



When the tool is selected once with the left mouse button, the Rectangular Area mode is activated, whereas a second click selects the Freehand Area mode. The area of the screen which is to be processed can be delimited by pressing the left mouse button over the image, moving the mouse to select the outline, and finally releasing the button. If the tool is selected a third time, the area to be processed is delimited by the current brush transparency plane (non-transparent regions are processed), as soon as the left mouse button is clicked when the pointer is over the desired location.

When the tool is selected with the right mouse button (or even with the left button, if no effect has ever been selected), the Filter Selection requester is displayed.

Effects like blurring are useful to merge new graphic elements or text better with a smooth background picture (e.g. a digitized image). In order not to lose image details, it is possible to mask (section 7.2.3) all the colors in the palette, except those of the elements which are to be integrated: the blur operation will affect only the edges of those items, while the background image will remain intact. Image processing of masked objects also gives nice effects on text strings (e.g. "Edge Detect" gives outlined text, "Dark Vertical" shades the letters, "Randomize" cuts the edges of the letters).

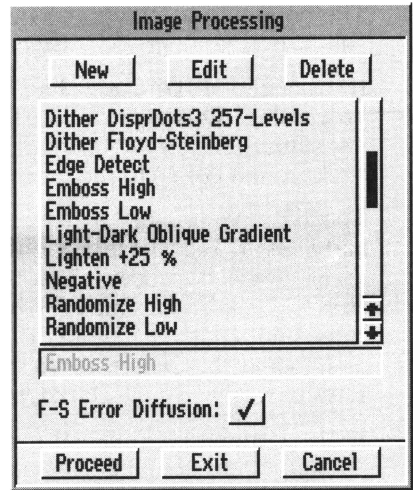
Image processing may be stopped by pressing any key on the keyboard. In this case, the Undo gadget can be used to restore the partially processed image.

3.1.4.1 Filter Selection

This requester allows the user to define a new filter or select, edit or delete an existing one. The list box contains the names of all the predefined effects. New effects are automatically added to the list as they are defined. Section 8.2 explains how to store selected or all effects for future reuse.

To select and use an effect, it is sufficient to double-click on its name, or click once and select Proceed. The New and Edit gadgets respectively open the Edit Filter requester to define a new filter, or modify an existing one. Delete removes an item from the list.

Floyd-Steinberg error diffusion may be used to combine the colors in the palette to approximate a particular color. This usually gives smoother color transitions (e.g. in "Dark Vertical Gradient"). If this option is not selected, the best matching single color is used to represent each pixel. Error diffusion is not available for all types of filters.



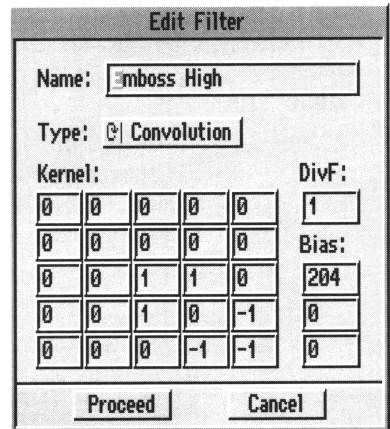
The Cancel gadget at the bottom of the requester undoes any changes made to the image processing settings and cancels the image processing operation. Exit does not perform the image processing operation, but maintains any changes to the settings.

3.1.4.2 Edit Filter

New and existing effects may be edited using this requester.

The Name string gadget at the top holds the name of the filter being edited, which may be up to 40 characters long.

The Kernel, Division Factor and Bias gadgets assume different meanings depending on the filter type. <Return> and <Shift>+<Return> respectively move the text cursor to the following or previous string gadget.



Convolution is a powerful area process that can be used to sharpen, blur, and modify images. The convolution operation replaces a pixel's value with the sum of that pixel's value and its neighbors, each weighted (multiplied) by a factor. The weighting factors are called the *kernel*. The kernel matrix is "slid" over each pixel in the image area. For each point, the kernel values are multiplied with the pixel (RGB) values "under" it. The sum of the results is then divided by the Division Factor and added to the Bias value. Finally, the color in the palette which best represents the result is placed at the center of the matrix.

The convolution may yield invalid kernel values (negative intensities, or values greater than 255). By default, these are clipped to the valid range.

If a negative Division Factor is set, its absolute value is used for processing. This also applies the hue of the current foreground color (and its saturation as well, if the foreground color is the same as the background color) to the result of the convolution.

The Bias parameter has a base value and two "modifiers": Bias DeltaX and DeltaY. Bias + DeltaX gives the effective bias value for the rightmost pixel which is processed, whereas the bias for the bottommost pixel is Bias + DeltaY. The bias for intermediate pixel positions ranges between Bias and Bias + DeltaX/Y. DeltaY increments are applied first. To understand this better, it would be interesting to study the result and the settings of the "Light-Dark Oblique Gradient" predefined effect.

In the Popularity filter, all pixels corresponding to non-zero positions in the kernel are counted. The most used ("popular") color is then copied to the central pixel.

Random filters use the kernel value with the same positional scheme as the Popularity and Convolution process (the center is the current pixel), but the values indicate how likely it is that each pixel-position in the kernel be used for the resulting pixel. A value of 0 means that a pixel would never be chosen. Equal pixel values (e.g. all '1's) would give to each pixel equal chances of being chosen. A value of '2' would mean double probability over a '1', and so on.

Dispersed, Clustered and F-S (Floyd-Steinberg) are all black and white (or whatever the current foreground and background colors are) conversion filters. The first two use the Division Factor value to pick a particular size dither matrix

Dispersed

- 1 = 4x4 matrix, 17 levels
- 2 = 8x8, 65 levels
- 3 = 16x16, 257 levels

Clustered

- 1 = 3x3 matrix, 10 levels
- 2 = 5x5, 26 levels
- 3 = 7x7, 50 levels

The Dispersed-Dots dithering technique gives good results for video images, while the Clustered-Dots dithering is better suited for higher resolution devices (e.g. laser printers). The Floyd-Steinberg dithering, however, employs error diffusion. All the dithering processes assume that the current background and foreground colors are, respectively, white and black. The brightness of the original pixels is rendered based on this assumption, but any color pair may be selected to achieve special effects. Unlike the color remapping functions of Personal Paint, the error diffusion techniques used for image processing take into account the brightness of the pixels, rather than plain RGB values.

3.1.5 Snap to Grid

If this option is selected, all positioning and sizing will snap to the intersection of the nearest two lines of a grid. The exact position of the (imaginary) grid and the distance between the lines can be modified by selecting the Snap to Grid tool with the right mouse button. This activates a requester where the values (expressed in pixels) can be set.



The Offset values allow for fine positioning of the grid on each axis, and should range between 0 and Step-1. It is also possible to enter a pixel-position with origin 0:0. The coordinates are automatically "normalized" to the valid range and that point becomes one of the "snap points".

Snap to Grid	
X & Y Step:	0 10
X & Y Offset:	0 0
Proceed Cancel	

Each of the two environments may have it's own, different, grid settings.

3.1.6 Define Brush

When this tool is selected, the "Brush Definition" mode begins. The gadget remains highlighted until a brush is defined. If the gadget is selected again while it is highlighted, it toggles from the Rectangular to the Freehand Brush mode, and vice versa.



A brush is defined by: moving the pointer over any point of the brush outline (an angle, in the Rectangular mode), clicking the left mouse button, moving the mouse to mark the outline completely and releasing the mouse button. In Freehand mode, the path is closed automatically if it is left open.

The brush can be defined either with the left or with the right mouse button. If the left button is used to mark the outline, the brush is simply copied from the selected region. The displayed image is not modified. If the right mouse button is used, the brush is "cut" from the image area, leaving a "hole" which is cleared using the background color.

Selecting the tool with the right mouse button is equivalent to selecting the Brush/Restore menu item: the previously defined brush becomes active, and its last transformation is undone.

It may happen that a brush has to be defined while another brush still needs to be used. Personal Paint can use up to nine different brushes. More brushes can be stored in files (section 5.2). Before defining a new brush, a free or unused brush number can be selected from the Brush Number menu (by clicking with the right mouse button on the little number in the group of built-in brushes - section 3.1.1). Chapter 5 is entirely dedicated to brushes.

If the Snap to Grid mode is active, the brush handle is also "snapped".

Otherwise, it wouldn't be possible to reposition the brush on the spot it was taken from.

By default, all pixels in the current background color are considered to be "transparent" when the brush is defined. If the Backfill Transparency option (section 8.14) is selected, only the background colored pixels which surround the image are treated as transparent.

3.1.7 Zoom



This tool, selected with the left or right mouse button while the Magnify mode is active, allows the user to respectively zoom in or out, i.e. enlarge or reduce the image.

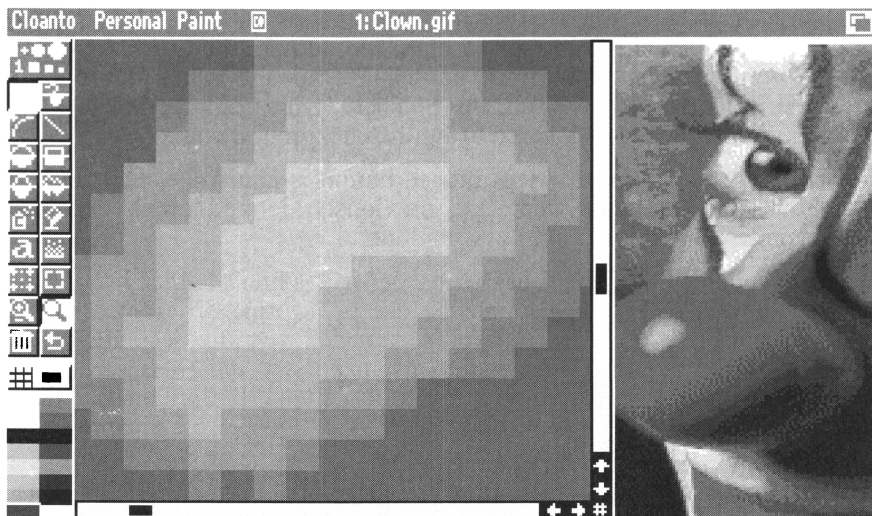
The two environments have independent zoom (magnification) levels.

3.1.8 Magnify



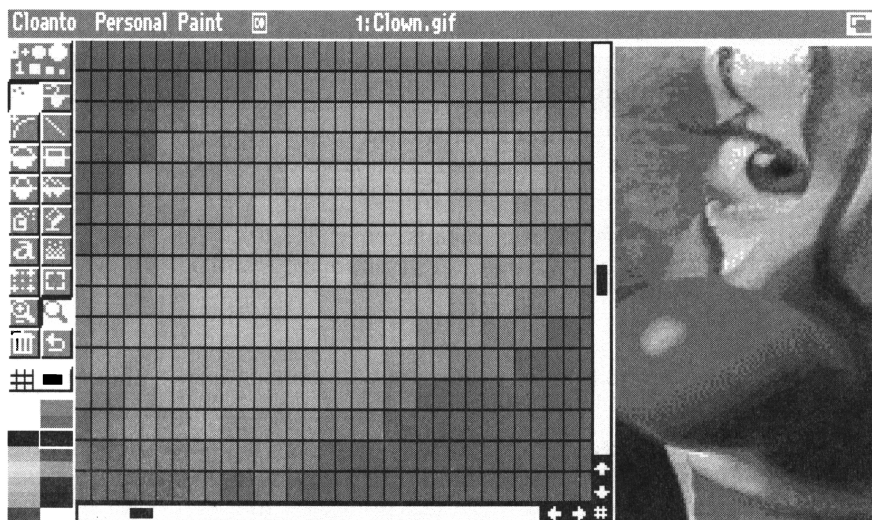
This tool activates the Magnify mode, a sort of digital magnifying glass. The left part of the screen is used to display an enlarged part of the image. The portion to be enlarged can be defined by clicking the left mouse button, moving the mouse to enclose the area in the rectangle which is displayed, and releasing the button. If the button is pressed and released without moving the mouse, the default or previous zoom level is applied. Magnify mode is terminated by reselecting the tool.

Two scroll gadgets, below and to the right of the enlarged image, may be used to "slide" the enlarged view in the desired horizontal or vertical direction. The cursor keys may be used to obtain a similar effect, moving the image. The magnified image may also be "grabbed" with the central



mouse button of three-button mice. On other mice, this is equivalent to pressing the left mouse button while the <Left Alt> key is held down. The same button can be used to indicate a particular spot in the "normal" part of the screen which is to be magnified. The image on the left is scrolled accordingly.

During Magnify mode, the clipping area (section 8.13) remains delimited by the normal, non-magnified part.



The gadget at the bottom right corner of the magnified window activates a grid which may be displayed to separate the enlarged pixels, to ease detailed editing. Three modes can be selected and deselected by cyclically clicking on the gadget: the default mode (no grid), line and dot mode. In line mode, a grid of lines is displayed over the entire enlarged area. The resulting pattern creates a small outlined box for each dot. The lines are displayed in the current grid color (section 3.1.11). Dot mode is similar, only that color zero is always used to draw the lines which make up the grid.

A screen flash may indicate a low memory condition which could make it impossible to activate the tool.

3.1.9 Clear

This tool clears the image. Technically, it applies the current background color to the entire image, or to the current view (if Clip Graphics is active - section 8.13).



Normally, the operation can be undone with the Undo tool. However, by clearing the entire image twice, the undo buffer is freed as well. This may

be useful when memory is low. The Free Current menu item (section 4.8.5) may be used to free even more memory.

3.1.10 Undo

This tool undoes the effect of any tool or image processing function described in this chapter. Consecutively clicking Undo twice performs a "Redo".



The gadget may be shadowed to indicate that the undo buffer is empty. This may also mean that there was not enough memory for the previous graphic operation to allocate an undo buffer.

Selecting the gadget with the right mouse button frees the undo buffer (after displaying a warning message). This is an extremely useful way of making some memory available in critical conditions.

The Brush and Color Palette menus have Restore functions which provide for additional undo capabilities (sections 5.5 and 7.1.6).

3.1.11 Colors

The color indicator just below the painting tools indicates the current foreground, background and grid colors.



The central rectangle on the right indicates the foreground color. This is the color normally used for painting with the left mouse button. After clicking on it with the left mouse button, that color may be changed by "picking" a new color from the displayed image (again using the left mouse button).

The region around the foreground color indicates the background color. This color is used by the Clear tool and when painting with the right mouse button. Just as with the foreground color, a new background color can be selected by first clicking on the background color region and then picking a new color, all with the left mouse button.

The pattern to the left of the current foreground and background colors indicates the grid color. This is the color used for displaying the (optional) grid over the magnified image area (section 3.1.8). Like the other colors, it can be modified by clicking on the pattern and then picking a new color (with the left button).



If the right mouse button is used over the color indicator, the Edit Palette requester (section 7.1.3) appears. It can be used to modify or rearrange the colors.



The palette below the color indicator shows all the colors which may be selected directly with the mouse. The left mouse button selects the foreground color; the right button picks the background color; the

middle button (or <Alt> + left button) selects the grid color. Especially if there are a lot of colors, and the screen or pointing device resolution is very "grainy", it may be better to press the desired button, move the pointer slowly until the selected color appears in the indicator, and finally release the button.

3.2 Moving Around

As mentioned in Chapter 1 and in the section dedicated to the Magnify mode (3.1.8), the displayed image can be scrolled using the keyboard and the mouse. The cursor keys can be used to move the image by four units into the direction which is indicated. The image can be fine-scrolled by holding down the <Shift> key. Like the other keyboard shortcuts, these keys can be redefined (section 1.14).

The image can also be "grabbed" with the mouse, by pressing the middle mouse button of three-button mice, or <Alt> and the left mouse button.

In bigger than standard video overscan modes, the offset of the screen can be set by pressing <Ctrl> plus the left mouse button, and moving the mouse.

The Settings/Coordinates submenus can be used to activate the display of the current mouse coordinates on the title bar. This is especially useful when distances and dimensions are easier to calculate numerically.

The area of the screen used to display the image can be made larger by removing the tool bar and the title bar (<F9> and <F10> keys, respectively). On some Amiga computers, due to hardware limitations in overscan screen modes, it may happen that the mouse pointer cannot follow mouse movements on the topmost lines of the screen, where the title bar would normally appear. Personal Paint continues to accept and handle mouse movements normally in these few lines. The brush image continues to indicate the current position correctly. The Amiga pointer will stay at the same height, even if the mouse pointer is moved up and down in this strip.

3.3 The Title Bar

The title bar occupies the top lines of the screen. It can be removed and redisplayed with the <F10> key. Menus appear by pressing the right mouse button when the pointer is over the title bar (or on the topmost line of the screen, if the title bar has been removed).

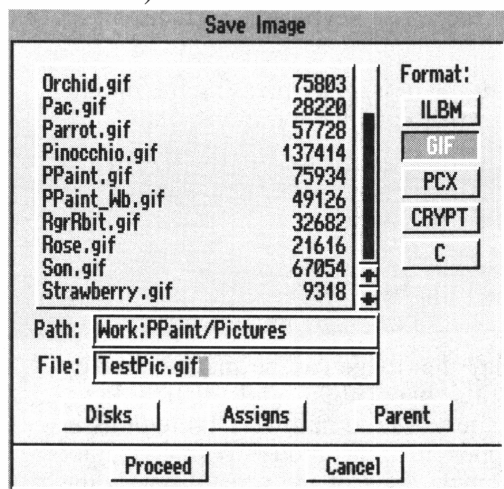
The title bar contains the following information: program name and version (if no picture has been loaded or saved), current brush paint mode symbol (section 5.7), optional line pattern mode symbol (section 3.1.2.2.1), area pattern/gradient (section 3.1.2.2.2), stencil mode (section 7.2),

Cloanto Personal Paint   1:TestPic.gif *416 ‡180

coordinates (section 8.5) and Amiga standard screen gadgets. If the picture which is displayed has a name, it is prefixed by a "1:" or "2:" sign, indicating the current environment. The stencil information is very useful if the stencil is often switched on or off with its keyboard shortcut (the spacing grave accent, unless redefined).

3.4 The File Requester

The file requester is the requester most used by the different functions of Personal Paint. The main difference between the file requesters invoked by different functions is the title indicating function name (e.g. "Save Brush").



The requester is called "file requester" because it allows the user to work with file names (section 1.4). When a function which needs to write data in a new file, update a file or load data from an existing file is selected, the standard file requester is displayed. In general, the file requester is displayed whenever one must define which file is going to be the target of an input/output operation. Sections 1.4, 1.5 and 1.11 should be carefully read and understood before this section is read.

To identify a file so that it can be accessed, it is necessary to specify the name of the volume or device on which the file is stored, either physical or logical (sections 1.4 and 1.11, e.g. "PPaint" or "DF0"), the remaining path (i.e. the drawers the file is in) and the file name itself. The names can be written using the keyboard or selected with the mouse (which is much easier than explaining how to do it). Normally, everything is done with the mouse, except typing the name of a file to be saved for the first time.

The upper part of the requester contains the *list box*, which can either contain file and directory names, or logical "assigned" names, or physical device and volume names. It is possible to alternate between the three modes by clicking the right mouse button, or by selecting the Disks, Assigns and Parent gadgets.

All file and directory names found following the specified path can be viewed in the list box. After the complete list has been read by the program, the names are sorted in alphabetical or date order (section 8.8.4). Directory names are grouped at the bottom or top (section 8.8.3)

of the list, preceded by a "(dir)" prefix. Not all names which are listed necessarily belong to files or directories which contain data useful for Personal Paint (section 1.5). Some of the names used by the Amiga operating system are excluded from the list.

If the list of names is longer than the screen space reserved for the list box, only part of the file names is displayed. The knob to the right of the list box can be used to shift the displayed portion of the list up or down. The knob can also be moved by briefly pressing the left mouse button when the pointer is over the container of the knob (but not over the knob). In this way, the knob is "attracted" towards the mouse pointer whenever the left mouse button is pressed and the names in the list box are scrolled by an entire list box page at a time.

The list box normally displays the names of all files and directories contained in the directory and volume (or device) specified in the Path gadget.

Once the name of a file, directory, volume or device is displayed in the list box, it can be selected with the mouse. When the left mouse button is pressed and released, the name displayed under the mouse pointer is selected. If the name of a volume, device or drawer is selected, the Path string gadget is automatically updated. If a file name is selected (e.g. the name of a picture file), the File string gadget containing the file name is updated.

Every gadget of the file requester, including the knob, can be selected while the list box is being updated. During this phase, new names are continuously inserted at the bottom of the list, rather than sorted. In this way, the order of the displayed names cannot change unexpectedly while a new name is about to be selected. To avoid undesired selections during the display update, the displayed names are not modified while the left mouse button is pressed, and the selection of a name is accepted only if the mouse button is released over the highlighted name. If the mouse button is pressed when the pointer is over a name, but released when the pointer is not over the same name, no selection is made.

Just below the list box is the Path string gadget. The selected path (including the device name) is always displayed in the gadget. The gadget can be selected to be updated with the keyboard, but this is normally not necessary, as both the volume or device name and the names of the drawers can be selected with the mouse as explained below. The <Return> key must be pressed after the text of the string gadget has been modified with the keyboard.

The format of the text in the Path string gadget is the following: device name + ':' (colon) + drawer names. A '/' (slash) must separate two drawer names. This means that each drawer name is separated by the name of the drawer containing it by a '/' sign. The volume or device name should

always be specified and followed by a colon, even if no drawer names are written. If no volume or device name is selected, the name of the program's current directory is automatically placed in the string gadget. The file name itself must not be written in this gadget, but in the File string gadget below.

When the requester is displayed for the first time by a function, the Path gadget contains the default path name of that particular function (e.g. "PPaint_Prefs").

The File string gadget under the list box contains the name of the file. The content of the string gadget is automatically updated if a file name is selected with the mouse from the list box.

The maximum length of the full path (device + drawer names) which can be written in the Path gadget is 128 characters. As explained in section 1.4, the length of file names (File gadget) should not exceed 25 characters. The number of names which can be stored in a list and displayed in the list box is limited only by the available memory.

Below the File gadget are the Disks, Assigns and Parent gadgets. Personal Paint automatically detects all storage devices connected to the computer and the volumes (e.g. disks) mounted in these devices. All these names are displayed in the list box when Disks is selected. When one of these names is selected with the left mouse button, the Path gadget is updated and the list box is again used to display file and directory names.

The Assigns gadget works similarly to Disks, by displaying logical names assigned to volumes, devices and directories.

If the "Expand Path" option is activated (section 8.8.1), Personal Paint will automatically replace device (or logical) names with the associated volume name in the Path string gadget. Devices other than standard disk drives are included in the list box. Files saved in devices like "RAM", "RAD" or "VD0" (all of which are RAM-based) are lost after the computer is switched off.

When Parent is selected, the rightmost name in the Path string gadget is removed from the path. The Parent gadget can be used to "pop" off drawer names and the volume or device name without having to use the keyboard. The gadget is called Parent because it can be used to move to the parent directory of the current directory, which is the directory which contains the currently displayed files.

To confirm the selection of a file and remove the requester, the Proceed gadget must be selected, or the <Return> key can be pressed when the cursor is in the File string gadget, or double-clicking (quickly pressing the left mouse button twice) on a file name in the list box. The double-click function can be disabled, if considered dangerous, as described in section 8.8.5.

If the Cancel gadget is selected, the function which displayed the file requester is aborted. Any changes in the gadgets of the file requester are undone.

An optional safety check (section 8.8.6) causes a warning message to be displayed if the function which displayed the file requester would overwrite some existing data. Other messages are relative to the function which displayed the file requester. Appendix A lists the messages of Personal Paint. Section 10.2 contains important information on how to handle errors which may occur during read/write operations to peripheral storage units.

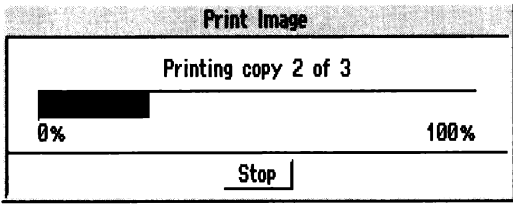
Section 8.9 explains how to choose whether Workbench icons should be associated with files being saved or not. Different kinds of icons can be selected.

The Amiga operating system may perform another disk write operation some seconds after a file has been stored. For this reason, a disk should not be ejected from the drive (nor should the computer be switched off) for some seconds after the disk drive activity indicator light goes off.

3.5 The Progress Indicator

In some time-consuming tasks, like loading a picture, complex resizing or brush image processing, it is possible, and useful, to present information in real time about the projected completion time, how fast the job is proceeding and how much has already been completed.

The Progress Indicator displays this information, listing the operation currently being performed and the percentage already complete. The Stop gadget allows the operation to be stopped.



One may be busy doing other things in another screen waiting for Personal Paint to complete a more complex job. For this reason, the program flashes the display and emits a sound to indicate it is finished.



4. The Project Menu

This chapter describes the functions which can be accessed through the Project menu of Personal Paint. This menu contains all commands used to load, manipulate and save entire pictures. Other commands, which are used to define the screen and image size, to obtain information on available and occupied memory, or terminate the work with Personal Paint, are also included in this menu.

Project	
Load Image...	l
Save Image...	l
Print Image...	P
Grab Screen...	
Image Format...	i
Image Processing...	a
Flip	›
Environment	›
Show Image	S
Delete File...	
Memory Information...	?
About...	
Quit	Q

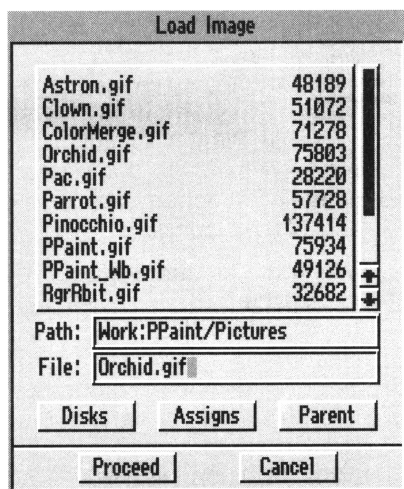
4.1 Load Image

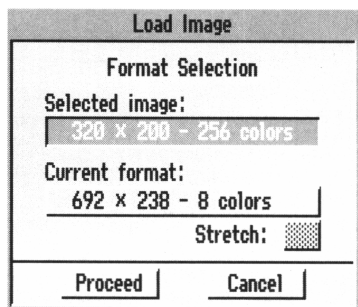
This function loads the image selected through the file requester, changing the screen mode if necessary.

The file requester is described in depth in section 3.4. Error messages which may occur are described in detail in appendix A. Section 10.2 deals with possible disk-related problems and solutions.

As soon as Personal Paint begins loading the file, it detects the file format (IFF, GIF, PCX, etc.) and applies the appropriate conversion procedures. Different image sizes and display ratios may require screen formats other than the current one. For example, a 640 by 480 pixel image would be displayed better in high resolution overscan interlace mode than on a standard low resolution non-interlaced screen. Even more suitable video modes may be available on the computer being used. IFF files generated by Amiga software usually contain detailed information about the video mode to be used to display the image. Other formats do not contain such information, so Personal Paint has to compare the size of the picture with the available video modes.

If Personal Paint detects a difference between the current screen mode (or





number of colors) and a better suited video mode which is available, it displays the Format Selection requester. The first two gadgets are respectively associated with the format of the selected picture, and the format of the image which is displayed. The first gadget is preselected by default. If Proceed is selected without changing the status of the two format gadgets, the load operation continues and a screen is opened automatically in the new video mode. If the second gadget is

selected, the current screen format, number of colors and image size are left unchanged. If the picture is wider, or larger, than the current image format, it will be loaded only partially. Intermediate or more custom tailored screen and image format combinations are possible by first choosing an image and screen format (section 4.5), and then loading the image without using the suggested new format. The Stretch option may be activated to "stretch" the picture to fit into the current image format (more on this function in sections 4.5 and 8.15). Cancel may be selected to abort the load operation (without losing the image which was displayed).



On Amiga operating systems starting from version 2.0, it is possible to specify the video modes which can be used. The selected display modes should be activated by copying the associated Workbench icon into the "Wbstartup" (version 2.0) or "Devs/Monitors" (version 2.1 and 3.x) system drawers. Otherwise, Personal Paint will not be able to use those modes. Conversely, video modes which are not supported by the display hardware should not be activated. Section 10.4 discusses more aspects related to screen modes and video devices.

When the picture is loaded its colors are always loaded with it, whatever the selected format or stretch selection. If the final screen mode supports fewer colors than those used in the image, the image is *color-reduced* (sections 7.7 and 8.6). This is a very powerful feature of Personal Paint, as it allows the user, for example, to load photographic-quality pictures and display them on any Amiga, even using only 16 colors. This manual has a section dedicated to the different kinds of color reduction (8.6) and error diffusion (8.7) which are available. Section 4.5 has more on screen modes and color-related issues. Section 7.1.4 explains how to make global changes to an image's palette (like adjusting contrast, brightness, etc.)

If the file contains information relative to a Color Mask (Stencil, section 7.2), it is loaded and applied as well. This only applies to IFF files.

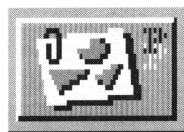
An encryption key may be requested if the file is encrypted and no key

had previously been given. The load operation fails if the file cannot be decoded using the encryption key. In such a case, the key should be set properly (section 8.3) before attempting to load the image again.

The Amiga operating system (version 2.1 and beyond) supports MS-DOS disk formats in an application-transparent fashion. This means that, if the "PC" DOSDrivers are installed (or the CrossDOS software, or an equivalent third-party product), Personal Paint will be able to read and write picture-files which can be shared among the PC (and Mac, where MS-DOS filing systems are supported) environments. For example, the MS-DOS device can be activated on drive 0 by double-clicking on the PC0 icon, or by moving that icon from "Storage/DOSDrivers" to "Devs/DOSDrivers".

4.2 Save Image

This function saves the displayed image. The file requester (section 3.4) is used to define or select the file name and choose a file format.



The Save Image file requester has additional gadget-options to select the picture's file format. IFF ILBM (from "Interchange File Format - InterLeaved BitMap") is the Amiga standard format. GIF achieves better data compression (i.e. the files are shorter) and is a widespread standard on electronic bulletin boards and PC-compatible systems. PCX is more used by simple PC paint and scanner interface software. The Encrypted format is useful to protect "private" pictures. The C source code format is suitable for embedding image data into Amiga graphics programming environments.

In the ILBM format, if a stencil (color mask, section 7.2) is active, it is saved as well.

GIF, ILBM and other formats may employ 24-bit color palettes. Personal Paint always encodes colors using 24-bits ("true color") for higher quality. This ensures best results with image processing, error diffusion (e.g. Floyd-Steinberg), color reduction and format conversions. Colors are rounded to the closest Amiga color step (12 bits, i.e. 4 bits for each Red, Green and Blue component, on original Amiga architectures) only when they are copied into the environment palette. To convert an image with a palette having finer steps than the best Amiga video mode from one format to the other, it should be loaded as a brush, and saved again in the new format. By default, palettes and bitplanes of brushes which have been loaded are left intact.

Internally, different PCX subformats may be used in order to achieve best compatibility with existing PC systems. Two-color images are saved as CGA monochrome files. In this format, a few readers may assume color 0

to be black, and color 1 to be white. In such a case, the two colors should be exchanged in Personal Paint's palette before remapping (section 7.3) and saving the picture. Images with 4 or 16 colors are stored as EGA/VGA 16-color files (adding extra empty planes if necessary). Images with more colors are stored as 256-color VGA files.

Encrypted images are modified using a key. If the picture is not loaded using the same encryption key, it will be unreadable. Section 8.3 has more information on encryption in general, and describes the requester used to define the encryption key. The requester automatically pops up when an encrypted file is loaded and no encryption key is set, or if the key was set and cancelled. Otherwise, the previously used encryption key is considered valid. The file name is not encrypted.

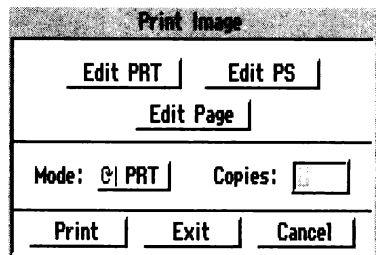
This note is mainly for programmers. C source code files also contain a filled-in Amiga *DrawImage()*-compatible *Image* structure and arrays with color palette data in formats suitable for both *LoadRGB4()* and *LoadRGB32()*. Unused bitplanes are not output as data, but marked in the appropriate *PlanePick* and *PlaneOnOff* fields. The image array data type is defined as "UWORD chip". The "chip" keyword is used by some compilers to make sure that the data is loaded in Amiga Chip RAM at run time. It may be necessary to remove it, or modify it into a different name (e.g. "__chip").

Any problems encountered by Personal Paint or the Amiga operating system during the save operation are signalled through specific messages. Appendix A lists all program messages. Section 10.2 contains important information on how to handle any errors which may occur during a write operation.

Sections 3.4 and 8.9 have more on file requester and Workbench icon settings.

4.3 Print Image

The main requester which is displayed when this menu item is selected gives access to Personal Paint's printer settings. Personal Paint can either work with any printer driven by the Amiga Preferences options and drivers, or work in its own PostScript mode. The two modes have separate sets of options. The paper format, which may be different from the image format, can also be set from here.



Before printing a picture (usually after installing the system or a new printer), the correct printer driver must be selected using the Amiga Preferences. Appendix D lists some common printer and driver

combinations. The Amiga Preferences *Printer* and *PrinterGfx* (Printer Graphics) options are equivalent to most of Personal Paint's settings with the same name. Personal Paint shares and exchanges this data with the system Preferences. Personal Paint's PostScript mode does not require the system PostScript modules (Workbench 2.1 and beyond), and will work fine with any Amiga printer driver.

Personal Paint reads the system printer preferences to set its initial printer defaults, and updates incompatible settings when any Preferences options are changed. After that, any modifications are not copied back to the Amiga system preferences. Each of the two environments may have its own, different, printer settings.

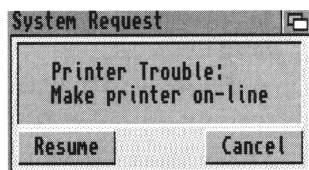
The top three gadgets in the main print requester are used to activate the requesters specific to the page layout, system (Preferences) printer options and PostScript settings. The Mode gadget is very important: it determines whether Personal Paint should print using the current system printer (PRT), or work in PostScript (PS) mode instead. The Copies gadget allows the user to set the amount of identical copies to be printed.

PostScript-related color correction is described in detail in section 4.3.3.11.1. The requester described in section 7.1.4 (Adjust Color Palette) may be used with all printers, to adjust the picture contrast and brightness or apply other corrections.

In addition to the Print (similar to the more usual Proceed) and Cancel gadgets, Exit can be used to leave the requester without printing anything, but confirming any changes made to the settings. Cancel aborts the printing and undoes any changes made. Print outputs the displayed image.

While printing is in progress, it can be terminated by clicking on the Stop gadget. The effect of this may be somehow delayed by the printer driver and the printer's buffer, which may have accumulated some data. To suspend the printing immediately, the printer must be deselected (switched off-line, or paused). This can be done by accessing the printer's control panel. Once the printer is deselected, it remains inactive until it is selected (switched on-line) again. The printing continues when the printer is re-selected. When the printer is switched off- and on-line, the content of its buffer is usually not cleared. This means that the printing will continue from where it was interrupted. Some printers let the user clear the content of the buffer through the control panel, while others must be switched off while deselected.

A system requester is displayed some seconds after the printer is deselected (or it is out of paper). The right gadget of the system requester must be selected to inform the system that the printing is to be suspended. The left gadget



resumes printing.

Section 10.3 and Appendix D have more on printer related topics.

4.3.1 Page Layout

These options are used to set the format of the output page, and the position, size and ratio of the image on the page.

Page Layout	
Measurement Unit:	☐ Letter ☒ Inch
Page Format:	☐ Letter ☒ Letter
Page Size:	.5 x 11.0 in
Center X:	☒ Left: 0.5 in
Center Y:	☒ Top: 0.5 in
Size:	0 x 0 ☐ Automatic
Printed Area:	
Landscape:	☒
Proceed Cancel	

4.3.1.1 Measuring Unit

The Measuring Unit gadget can be used to cycle through the different measurement units used by Personal Paint to indicate positions on the page. While the meaning of inch and centimeter is standard and obvious, there is no such universal definition of a "point". Personal Paint uses the PostScript point, which measures 1/72 of an inch, i.e. mm 0.353 (whereas 1 Pica point = mm 0.351, 1 Didot point = mm 0.376 and 1 decipoint = 1/720"). One inch equals about cm 2.54, and 1 cm = 0.3937 in. Internally, Personal Paint computes distances in micrometers for maximum accuracy.

4.3.1.2 Page Format and Size

The Format gadget can be used to cycle through several predefined paper formats. Custom indicates that user defined values specified in the Page Size fields will be used. When operating in PostScript mode, Personal Paint may be able to obtain the exact size of the paper being used directly by the printer, overriding the Format settings.

4.3.1.3 Automatic Centering and Manual Margins

The two center options allow for automatic centering of the image along the horizontal and/or vertical axis. When centering is disabled, the Left and Top margin values are applied strictly. With centering, the image is positioned between symmetrically equal margins.

4.3.1.4 Image Size

The Size gadgets can be used to manually set the image's dimensions, either using the default measurement unit, or in printer or video pixels.

The default setting is Automatic, where Personal Paint tries to print the image leaving it about as large as it would appear on a screen, reducing it only if it doesn't fit within the margins set for the page (but always preserving the original proportions). Paper % indicates an amount proportional to the page size. Units adopts the specified measurement unit. Pixels indicates the dimensions in printer picture elements. Times multiplies the image pixel dimensions by the amount which is indicated.

If one of the two image dimensions (or percent values, or multiplication factors) is set to zero, it will be calculated considering the other dimension and the original image ratio. If both dimensions are zero, the image will be printed as wide as the page format and the margins allow, and as tall as required to preserve the correct proportions. Specifying both image dimensions runs the risk of distorting the image as it appears on the screen, unless the exact screen and printer rendering ratios are known.

4.3.1.5 Landscape Orientation

If the Landscape option is set, the image is printed rotated by 90 degrees, i.e. along the side of the paper.

4.3.2 System Printer

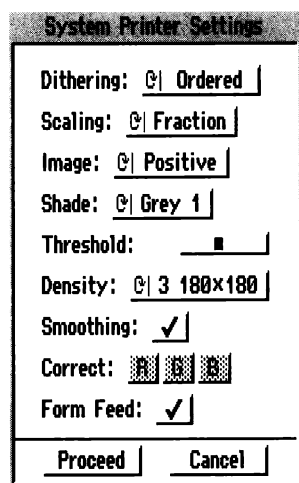
Most of these options are identical with their equivalent Amiga Preferences. The correct printer driver name must be selected using the system Preferences. The options of this requester have no effect on how Personal Paint outputs an image in PostScript mode.

4.3.2.1 Dithering

Just as the images on the screen are made up of tiny pixels, printed images are made up of tiny dots. Dithering refers to the printing of dots of different colors in such a way that they are so small and close together that the eye sees them as one color. This makes it possible to produce printouts which appear to have more colors than the three or four inks normally available on a color printer.

For example, where there is a black pixel on the screen, black dots will appear on the printout. However, if the pixel is purple, the printer might have to use dots of yellow, magenta and cyan to create the illusion of purple. In the case of gray scales, the printer will use varying patterns of black dots to replicate the intensity of gray on the screen.

If the Ordered dithering option is selected, color intensities are formed using an ordered pattern of dots, similar to a checkerboard pattern. The



dots may vary in color, but are of the same density and are printed in straight rows and columns. This is the system standard type of dithering.

In Halftone dithering, color intensities are formed by varying the size and density of the dots. This technique is similar to the one used in newspapers and magazines. It works best on higher density printers (more than 150 dots per inch).

For instance, while a pixel of black may be reproduced with four black dots, a pixel of purple may be printed using two red and two blue dots of varying sizes that are placed in such a way that to the human eye they look like purple.

The Floyd-Steinberg method employs a more complex error distribution algorithm. Basically, Floyd-Steinberg creates a dot pattern that maximizes the detail of the image by distributing the intensities of each pixel throughout the dots comprising that pixel, as well as throughout the neighboring dots. This option overrides Smoothing (if selected) and may slow down printing more than others.

4.3.2.2 Scaling

Scaling refers to the process of changing the size of an image. Fraction performs normal scaling.

The Integer selection guarantees that every pixel on the screen is guaranteed to appear as an even number of dots on the printout. For example, if the picture on the screen is 320 by 200, the printed picture will be either 320, 640 or 960 dots wide, etc., and 200, 400 or 600 dots high, and so on. This option is most useful when trying to print a picture that contains thin vertical and horizontal lines (like a grid).

The actual size of the printout will be determined by the image size printer settings (section 4.3.1.4). It will be scaled up or down to the nearest multiple of the width and height of the picture.

Integer scaling may override the Landscape setting (section 4.3.1.5), making it possible to get a slightly distorted picture. This option is also useful for printing out bit-image text, since the fonts will not be distorted due to fractional scaling. With Integer Scaling enabled, the size of the printed image may differ slightly from the requested size.

4.3.2.3 Image

When set to Positive, the Image setting leaves the image as it appears on the screen. When set to Negative, the image is "reversed" - what is black on the screen is printed as white, and vice versa. This is similar to a photographic negative.

4.3.2.4 Shade

The Shade option determines how different colors or gray levels are to be printed. Not all printers support all settings.

Black and White prints all colors either as black or white. Whether a color is printed as black or white is determined by the Threshold value. When black and white printing is selected, Dithering has no effect.

Gray Scale 1 prints colors in varying shades of gray. Gray Scale 2 supports a maximum of four shades of gray and is used for printouts of pictures designed on the A2024 monitor.

Color is applicable only to color printers. Colors are printed as they appear on the screen.

4.3.2.5 Threshold

In Black and White mode, the lightest color of the image will tend to be printed as white, and the darkest as black. Intermediate colors fall either into the white or the black half, as marked by the Threshold setting. When the setting for Image is Positive and the Threshold setting is low (around 2), only the darkest color on the screen is printed as black. Everything else is printed as white. Increasing the Threshold value causes more colors to be printed as black. If the Image Setting is changed to Negative, a low Threshold value will cause the darkest color on the screen to be printed as white, and vice versa.

4.3.2.6 Density

The Density gadget selects the print density, i.e. the number of dots which will be printed in an inch. The lower the density, the faster the printout (on those printers with multiple densities). The higher the density, the more dots are used to create the printout, and the sharper the image.

This option is not supported by every printer. Appendix D provides additional information on printer drivers.

4.3.2.7 Smoothing

Sometimes when printing diagonal lines, those lines may be jagged. When smoothing is turned on, the Amiga attempts to smooth diagonal lines to get rid of the jagged appearance. This option is best suited for printing images containing geometrical shapes and text. When smoothing is turned on, printing may be much slower.

4.3.2.8 Color Correction

Color correction gives a better match of the colors on the screen to the

colors on the printout. Color correction can be used on red, green, blue or on a combination of the colors. Color correction is turned on by clicking on the gadgets marked with R (red), G (green) or B (blue).

Color correction causes a reduction of the number of printed colors. When color correction is not used, all colors displayed by the Amiga can be printed on a color printer. For example, for each color which is corrected of a palette of 4096 (as in Amigas using the original chip sets), 308 shades of that color are lost.

The effect of color correction can be seen if a picture containing solid red, green and blue shades is printed twice. The first time, color correction should be left off. The second time it should be turned on for each shade. The shade of the second picture should more closely represent the colors displayed on the monitor.

4.3.2.9 Form Feed

If Form Feed is selected, a form feed (FF) command is sent to the printer after each image is printed. On some printers this command causes the printer to print the content of the page buffer and eject the page. On other printers, for example impact printers with automatic sheet feeder, the command causes the current sheet of paper to be ejected and a new sheet to be introduced from the paper hopper. If continuous forms paper is used, the command positions the printer head at the beginning of the following page (or form, or label).

If the option is activated, and the Page Length (section 4.3.1.2) is a multiple of 1/6 or 1/8 of an inch (the two vertical positioning units supported by the Amiga printer device), Personal Paint also attempts to program the printer's form length. This is very useful for precision printing of multiple copies on non-standard forms like labels.

4.3.3 PostScript

This requester contains all the PostScript-specific settings. PostScript output is intended for PostScript printers, phototypesetters or other image processing systems. A non-PostScript printer will not be able to interpret and print PostScript data directly. It may do so, for example, if the PostScript output is fed into a software emulator (as are available for the Amiga) which in turn sends the processed image data to the printer.

Personal Paint uses Color and Level 2 PostScript extensions for maximum performance. It is also compatible with Level 1 systems, where it emulates the same functions. Refinement and testing of the Color PostScript code were performed on a NEC Colormate PS printer, kindly provided by NEC.

4.3.3.1 Image

The Positive/Negative Image setting is identical to the system setting described in section 4.3.2.3. The other option, Mirror, causes the image to be printed as it would appear reflected by a mirror. This option may be especially useful for burning plates directly from the output of a personal laser printer, where thicker and less transparent paper sheets are often used instead of transparencies.

4.3.3.2 Dots per Inch (DPI)

On some devices the output resolution (number of Dots per Inch, or DPI) can be programmed. For example, on the IBM LaserPrinter 4029 Series and the HP LaserJet 4, the resolution may be switched between 300 and 600 dpi (if there's enough memory). Other printers work in 300/600 dpi, 400/800 dpi or even higher resolutions. Phototypesetters work at resolutions higher than 1000 dpi (e.g. 1016, 1200, 1270, 2400, 2540 or 3048 dpi).

By setting the value to zero, the PostScript processor uses the printer's default. This is useful when the resolution of the target device is unknown. If DPI is set to zero and the Image Size (Page Layout, section 4.3.1.4) is set in Pixels or Times, a default of 300 dpi is assumed.

4.3.3.3 Lines per Inch (LPI)

When printing different shades of color using halftones (sections 4.3.2.1 and 4.3.3.4), the Lines per Inch (LPI) setting becomes very important. It determines the number of halftone cells per inch. The higher the number of cells per inch, the smaller the cells have to be. Smaller cells may represent finer details, but provide for coarser and more "grainy" color transitions. Larger cells, on the other hand, by allowing for more combinations of on/off dots inside the cell, yield much smoother-looking gradations, at the expense of image detail. The higher the resolution (DPI), the higher the LPI value that can be set without compromising on the amount of different colors (or gray levels). For example, at 300 dpi (or when printing on coarse newspaper paper), an LPI value of 75 might be appropriate. It could grow to 100 lpi at 600 dpi, and 150 lpi at 1270 dpi. But even at 1270 dpi, if very soft color transitions are desired, a value of 85 lpi could make sense. When preparing a job for a printer, higher values may exceed the precision limits of the printing press (e.g.

PostScript ® Settings

Image: ☒ Positive ☐ Normal

DPI: EPS: ☐

LPI: Crops: ☒

Spot: ☒ Default M. Feed: ☐

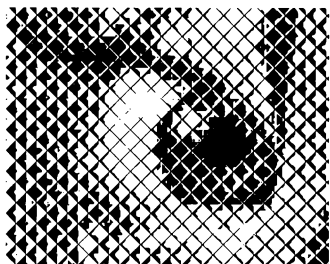
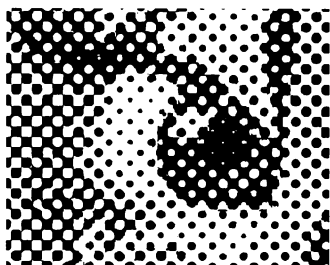
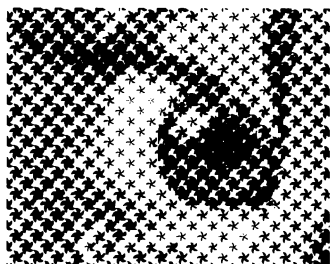
Output: ☒ SER Compress: ☒

Ink	Angle	UCR	Process
R: ☒	361.0	30.0	☒ Color
G: ☒	361.0	45.0	☐ GCR
B: ☒	361.0	50.0	☐ 100.0
K: ☒	361.0		

about 200 lpi for offset printing on highest quality paper, 150 lpi being a more practical limit). To experiment with different spot functions (section 4.3.3.4) and other special effects, 15 to 20 lpi may prove to be most interesting. A value of zero causes the device's default to be used.

4.3.3.4 Spot Function

Laser printing, offset and other types of printing have one common limitation: they can't print grays. There is either ink on a given area, or there isn't. The illusion of gray is created by a pattern of black (or any other color) dots. The bigger and closer the dots, the darker the area will appear. The pattern of dots (i.e. the halftone cell) may have different shapes: round dots, elliptical dots, lines, stars, etc. Different shapes of cells may result in more or less linear transitions from light to dark. Elliptical dots, for example, are often used to produce better middle tones. The first plain paper PostScript printers employed simple, round dots (Personal Paint DotIn). Larger dots would be used for darker colors. A generation of devices which followed (Dot2) used the same shape for grays up to 50%. For darker colors, however, the dots would be built from the corners, rather than the center (DotOut).



Personal Paint's Spot parameter can be used to select different shapes of cells. It is easier, and fun, to experiment with the different shapes than it is to describe them. To appreciate the differences in more detail, LPI should be set to a very low value (15 lpi, for example), and the image to be printed should contain a wide variety of colors, or gray levels.

The screen angle (section 4.3.3.11.2) may be changed to rotate the shapes. The difference may hardly be noticed when round dots are used, but is evident when a line screen is selected.

Different dot shapes may give different results in color separations, as the different interactions with screen frequency (i.e. Lines per Inch) and angle are directly involved in disturbing effects like moiré patterns.

4.3.3.5 Output

The Output parameter can be set to PRT, SER, PAR or Disk. PRT

indicates that personal Paint's output should go to the channel selected for the printer in the system Preferences (this may be one of several serial lines, for example). SER and PAR indicate the default serial and parallel ports. These latter two settings may be functionally equivalent to PRT, but faster, since the printer driver is bypassed. Disk indicates that the output is to be directed to a file. A file requester appears when printing begins, so that the file can be specified. By saving the PostScript output to an MS-DOS formatted disk (using CrossDOS, Dos-2-Dos, or the "PC" DOSDrivers available since version 2.1 of the operating system), it may be used directly by most printers and PC users.

4.3.3.6 Encapsulated PostScript (EPS)

Encapsulated PostScript (EPS) is a standard for importing PostScript files into different environments. For example, an image saved in EPS format can be used by desktop publishing packages on different computers. The image is then printed exactly (i.e. at the same LPI, etc.) as it would be printed with Personal Paint. On some printers, the DPI value may have to be set to zero (printer's default) before creating an EPS file.

4.3.3.7 Crop Marks

Crop marks (Crops) are thin lines which show the exact margins of the image. They are useful for cutting the paper. If the Crops option is activated when performing color separations, Personal Paint also generates registration marks, which are used for precise manual alignment of differently colored outputs.

4.3.3.8 Manual Feed

If the Manual Feed option is selected, Personal Paint tries to activate the printer's manual paper tray. Otherwise, the default paper tray is used.

4.3.3.9 Compression

PostScript files may become very long. It is not unusual for a file not to fit on a single disk, or for it to take several minutes only to transmit to the printer over a serial connection. Personal Paint's Compress option can reduce the file's length to less than 30% of the original size. It tends to improve as the image data increases (e.g. in high resolution images, or color separations). If the data transmission channel is not a main "bottleneck", compression may slow down processing on the printer side, especially on PostScript Level 1 devices.

4.3.3.10 Process

Process is used to select from the different PostScript output modes: Gray

(black and white printers), Color (color printers), CMY and CMYK (color separations). Gray and Color print each image in one sheet of paper. CMY and CMYK output each color component on a different page.

4.3.3.11 Color Separation

The letters used in "CMY" and "CMYK" are taken from Cyan, Magenta, Yellow and black (B cannot be used for black as it could be confused with blue). Cyan, magenta and yellow pigments are mixed by printers to simulate all other colors. This is called *subtractive synthesis*, and is

opposite to the *additive* method where red, green and blue light is combined to obtain the whole rainbow. Actually, cyan, magenta and yellow are the color opposites of red, green and blue: a colored pigment completely absorbs light of its complementary color. So, just as televisions and paint programs use RGB to create colors, printers use CMY. CMY and CMYK *color separations* are used to prepare the different films from which printing plates are burnt. Each plate is then used to print one *primary* color. One after the other, precisely aligned, the plates print the final image on paper. (The C, M, Y and K Ink gadgets are used to optionally avoid outputting the information relative to one or more primary colors.)

PostScript ® Settings

Image: ☒ Positive ☒ Normal	
DPI: 270	EPS: ☐
LPI: 133.0	Crops: ☒
Spot: ☒ Ellipse	M. Feed: ☐
Output: ☒ File	Compress: ☒

Ink	Angle	Process
C: ☒	15.0	UCR ☒ CMYK
M: ☒	45.0	30.0
Y: ☒	0.0	GCR 45.0
K: ☒	75.0	50.0
		100.0

There are two main problems with this process: the first is that "real" inks do not give ideal results when mixed; the second is that it is difficult to achieve in practice the "precise alignment" which would be required.

4.3.3.11.1 Color Correction and Undercolor Removal

In theory, different combinations of cyan, magenta and yellow could be mixed to produce the full range of colors. Real inks, however, contain impurities that make them absorb more than just one color. For example, when equal parts of cyan, magenta and yellow are mixed together, the result should range from light gray to black. Instead, it more often looks brownish. This is one of the reasons black is often used as a fourth ink. Also, black ink is less expensive than the other colored inks. Another advantage is that to produce black (or other dark colors), a lot of the other inks would have to be used. However, the more ink there is, the longer it takes to dry out and be ready for another printing pass.

Black ink can be used wherever all of the other three colors would be used. For example, an area where 25% cyan, 30% magenta and 45% yellow would be used, could also be printed using up to 25% black (and as little as no cyan, 5% magenta and 15% yellow). The UCRK parameter indicates the amount of black that can be removed from the cyan, magenta and yellow components and be substituted as a separate black component. 100% would mean that the quantity of black is equal to the lowest of the other three original colors (just as the maximum/minimum values in the previous example). In practice, full removal of black is not common, as registration (alignment) becomes critical (thin white borders may appear around solid black areas). Usually, up to 50% of the black is removed from the other colors.

The Gray Component Replacement (GCR) parameter allows the user to remove or add black ink to the amount of black which results from applying undercolor removal. A value of 100% would leave the result unchanged; 150% would add 50% black ink; 0% would cause black not to be printed (like unselecting K in the Ink column).

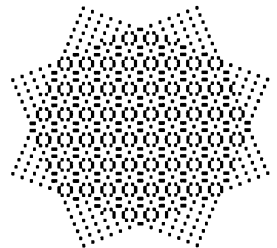
Yellow printer's ink is very close to pure yellow, and is generally treated as pure. Magenta ink, however, appears contaminated with yellow, and cyan with some magenta and a little yellow. The UCRM and UCRY parameters work similarly to UCRK, by extracting some magenta from cyan, and yellow from magenta, respectively.

The correct choice of undercolor removal and gray component replacement depends on the characteristics of the output device and the materials which are used. Manufacturers of color printers finely tune and configure their devices with the most appropriate values (Personal Paint's GCR and UCR are disabled in color printing).

4.3.3.11.2 The Moiré Effect

The registers and alignment marks which appear around an image to align different colors, as fine as they may be, are not sufficient to guarantee a perfect alignment. In most cases, the weakest chain in the printing process is the mechanical precision of the machines and the materials involved.

The *moiré phenomenon* consists of a visible "parasite" pattern that appears to the eye when two (or more) set of lines (or grids) are intersected. In television, it is common to notice such an effect when people wearing shirts or dresses with very fine and contrasted line patterns are interviewed. These patterns appear disturbed. In digital typography, this may happen when scanning an already halftoned image. In color printing, it is usually due to interference between the different halftone screens.



Since it is not reasonable to expect perfect registering of screens having the same angle, a different solution is used: each of the screens is rotated relative to the others, causing the moiré pattern to be very small. If the screen is fine enough, the patterns are almost impossible to see at a distance, much like halftone dots.

Personal Paint allows the user to individually set each of the four screen angles. In black and white (gray) printing, only the angle of black (K) is used. This is usually set to 45 degrees, which is assumed to be the least obstructive to the human eye. Yellow is the lightest and less troublesome color, so its angle is usually set to 0 degrees or 90 degrees. Cyan and magenta are generally printed at 30 degrees offsets from black (the largest possible offset when printing three colors), which gives them only a 15 degrees offset from yellow. Since cyan is also "dark", it is sometimes printed at 45 degrees with black at 15. Since halftones are usually composed of a grid of squares, there are only 90 degrees in which to distribute the four halftone screens, so 0 degrees is the same as 90, and 15 the same as 105, etc.

There are several rules for minimizing the moiré effects in color separation. Most of them are too complex to appear here. Generally, the lower the requested screen frequency (LPI), or the higher the resolution (DPI), the more rational angles are available, and the moiré danger due to approximation is reduced. On the other hand, higher resolution or higher screen frequency make smaller moiré patterns even less visible. Equal frequencies and angle distribution should not necessarily be the ultimate goal. In fact, better and less sensitive screen combinations may often be found with different frequencies for the various colors. Angle differences below 15 degrees (or even below 20 degrees) should be avoided, due to the strong 2-grating moirés which they generate.

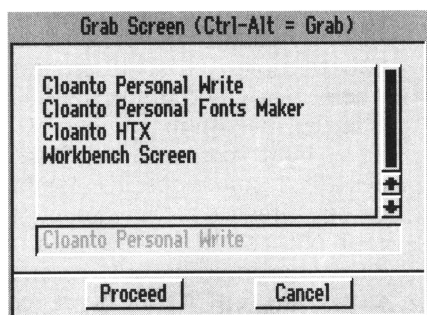
Common angle combinations for C, M, Y, K are: 75, 15, 0, 45; 75, 15, 90, 45; 105, 75, 90, 45; 15, 75, 0, 45; 0, 30, 60, 15; 30, 60, 0, 15. The results may vary using different screen frequencies (LPis). As the frequency goes up, less angles become available, and the moiré problem becomes more acute. Colors printed in a small area may appear to be "true", with moiré patterns appearing in larger areas.

If an angle value greater than 360 is set, the printer's default angle is used. Especially on color printers, the default printer values for angle and screen density should be tried first.

4.4 Grab Screen

Personal Paint can load and edit Amiga screens which are displayed by other programs as if they were a picture. The Grab Screen function copies the selected screen graphics into the current environment. The original screen is not affected by this operation.

The requester which is displayed is similar to a file requester, showing the names of all open screens. Some applications leave the screens they open unnamed. For these screens, Personal Paint displays additional bitmap size depth information. To load a screen, it is sufficient to double-click with the mouse on its name in the list, or select the name and Proceed.

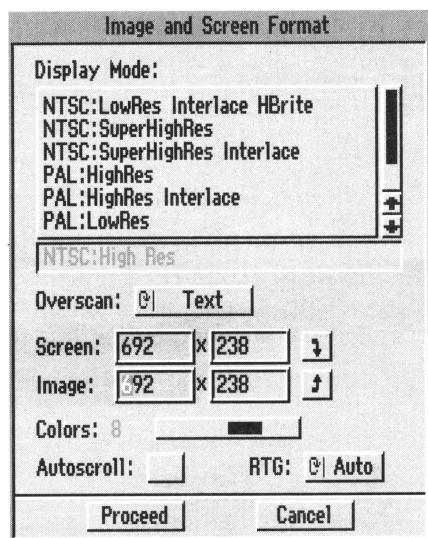


It is sometimes necessary to grab a screen while a particular window is active, a gadget is selected, or a menu is displayed. It is not possible to access these items at the same time as Personal Paint's screen grab requester is used. For this reason, Personal Paint offers an alternate solution for selecting the screen to be grabbed: simultaneously pressing the <Ctrl>+<Alt> keys on the left of the keyboard indicates that the frontmost screen is to be grabbed. A screen flash and an acoustical signal indicate that the screen has been grabbed. This method, like the standard selection, works only when the Grab Screen requester is displayed.

4.5 Image and Screen Format

Personal Paint does not put any limits to the image size. An image may be as large as the Amiga *blitter* circuits can handle. Similarly, the maximum number of independent colors which can be displayed at the same time depends on the version of the chip set which is mounted in the Amiga. Original and Enhanced (ECS) chip sets may display up to 64 independent colors ("Extra Half Brite" mode - section 7.1.3.1). On Advanced Graphics Architecture Amigas, Personal Paint may display up to 256 colors in most video modes. Each of Personal Paint's two environments may have its own screen mode and image size.

In addition to the standard graphics chips which are installed on the Amiga, Personal Paint may exploit graphics boards, as long as they conform to the Amiga Display Database conventions and are accessible by the blitter. The same size and color limitations just mentioned apply.



An image edited with Personal Paint is not limited by the size of the screen, which may contain only part of the image. Section 3.2 explains how to move and scroll around images which are larger than the screen. The screen mode limits the image only as far as the number of bitplanes (i.e. the maximum number of colors) is concerned. An image may not have more colors than those which can be displayed. Section 4.1 describes some options available when loading images having more colors. Brushes are an exception to this limitation: a 256-color brush, for example, can be loaded even on first-generation Amigas. It may not be displayed properly (only as many bitplanes as there are in the screen are displayed), but it can be processed (resized, rotated, etc.), printed and saved correctly.

The list box contains the names of all video modes notified to Personal Paint by the Amiga Display Database. Any video mode can be selected by clicking on its name with the mouse.

Most video modes also exist in an interlaced variant. On Advanced Graphics Architecture systems, a Double-Scan variant is also made available, starting from version 3.0 of the operating system.

Selecting an interlace mode doubles the number of video lines. Unless a "Flicker Fixer" card or other "Display Enhancer" circuitry is available, or the Double-Scan option is selected, the interlace mode will increase the flickering of the screen. This is caused by the fact that the original Amiga video circuitry cannot display twice as many lines as normal in a single video refresh pass: instead it refreshes the odd and even video lines alternately.

An interlaced screen requires about twice as much screen memory as a non-interlaced screen. Section 1.3.2 explains how to calculate how much RAM is required to open a screen. Higher resolution screens, in addition to requiring a lot of memory, may slow down the system considerably.

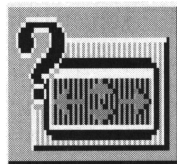
If the opening of the new screen fails due to memory shortage, Personal Paint first tries to open the screen with no overscan. If this fails as well, it attempts to open a small low resolution non-interlaced screen (320 by 200 pixels). If even this fails (which is highly unusual, and would indicate corrupt or extremely fragmented memory), Personal Paint tries again after gradually freeing as much memory as possible (closing the Workbench, releasing the undo buffer, freeing brushes, etc.)

Sections 10.1 and 10.4 contain detailed descriptions of problems and solutions related to memory shortage, screen modes and video devices.

4.5.1 Overscan

Most video modes can be opened in *overscan* mode. This means that the display is extended to an area which is normally around the screen area,

called overscan area. Different levels of overscan exist: Text, Graphics (Standard), Extreme (the largest area officially supported by Intuition, also called Maximum in older operating systems) and Maximum (highest overscan supported by hardware, formerly named Video). The exact overscan dimensions can be edited with the Overscan Preferences (operating system 2.0 and beyond). Not all monitors can fully display the same overscan screens. Under Amiga operating system versions prior to 2.0, the overscan mode is not a standard system feature, and can cause some drawbacks.



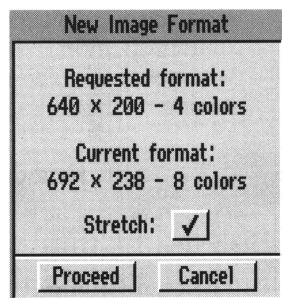
When the screen size exceeds the Text overscan area, it may be very useful to finely set the screen offset. This can be done by pressing <Commodore> (<Left Amiga>) plus the left mouse button, and moving the mouse.

4.5.2 Screen and Image Size

The screen size values reflect the selected screen and overscan mode. It is also possible to edit the numerical values which are displayed. The possibility of creating such a non-standard size adds another overscan mode, named Custom Overscan.

The image size may be set independently from the screen size. The two arrow-gadgets to the right of the screen and image sizes can be used to quickly make the image size the same as the screen size, or vice versa.

When an image format change is confirmed, a requester is displayed asking whether the size of the existing image should be preserved or changed to the new format. In the latter case, a Stretch option can be selected to shrink or stretch the graphics to the new size (otherwise, the image could be cut). Color reduction, if required, is always performed.



4.5.3 Number of Colors

The Colors gadget controls the numbers of colors of the selected screen. The minimum is two colors. The maximum depends on the screen mode and the display circuitry. Original and Enhanced (ECS) chip sets may display up to 32 colors (64 in HBrite) in low resolution screens (i.e. about 320 pixels wide), 16 colors in high resolution screens (i.e. about 640 pixels wide) and 4 colors in Productivity (VGA) and A2024 modes. Most of these limits have been raised to 256 colors in the Advanced Graphics Architecture chip sets.

4.5.4 Autoscroll

The Autoscroll option, which is supported by Amiga operating systems from version 2.0, enables automatic scrolling if the page exceeds the screen format. Scrolling is performed as soon as the mouse pointer reaches the edges of the screen. Some display cards which are available for the Amiga require this option in order to open custom screens in given sizes. In some overscan modes, autoscroll may not be completely supported by the operating system. If the title bar is hidden (section 3.3), menus can be displayed by holding down the <Ctrl> key when the right mouse button is pressed.

4.5.5 Retargetable Graphics (RTG)

Some display cards store the image data in a region of RAM which cannot be accessed by the Amiga blitter. Other expansion boards use an internal copy of the image data, which is automatically updated by the display driver software whenever the image is modified. Changes applied to the image by the blitter, however, may not be detected under all conditions.

Personal Paint may use the Amiga blitter directly whenever this improves performance on standard Amiga computers. Activation of the RTG option inhibits any use of the blitter which might pass undetected by the display card, or conflict with its RAM allocation scheme. In the Auto mode, Personal Paint detects whether RTG is required for the particular screen mode, and proceeds as necessary. Unfortunately, due to the lack of standardization, this may not work with all graphics expansions. Whenever a new display card is used, it is best to test the different settings with all video modes.

4.6 Image Processing

This function is identical with the Image Processing tool described in section 3.1.4, except that it is applied to the entire image.

The Clip Graphics option (section 8.13) may be set to limit the part which is modified to the visible screen area.

Image processing may be aborted by pressing any key. Selecting the undo tool restores the partially changed image.

4.7 Flip Image

These function are similar to their brush counterparts (section 5.11.3), but act on the entire image (or as specified by the Clip Graphics option, section 8.13).



4.7.1 Horizontal

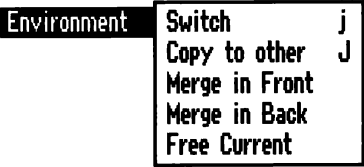
Horizontal Flip produces a mirror image of the original.

4.7.2 Vertical

Vertical Flip turns the image upside-down.

4.8 Environment

Personal Paint offers two independent working environments, which may even have different graphic resolutions and image sizes. A number on the title bar, immediately before the name of the picture, indicates the current environment number (one or two).



When the program starts, it allocates memory for one environment. The second environment is built when it is entered for the first time.

4.8.1 Switch

This command enters the other environment, and, if it doesn't exist yet, it creates it (then enters).

4.8.2 Copy to Other

This command copies the current screen and image format, data and settings to the other environment. It does not enter the other environment. It issues a warning message before altering an unsaved image in the other environment.

4.8.3 Merge in Front

This command copies the image of the other environment over the current image, leaving background colored pixels of the source image transparent. This means that only those pixels which are not painted in the background color of the other environment are copied to the current environment.

If the two environments have different color palettes and/or sizes, the source image is remapped, color-reduced and/or stretched before it is copied over the current image.

4.8.4 Merge in Back

This command drops a background behind the current image. It is similar to Merge in Front, except that it copies the other environment's image to

the current environment. It affects only background colored pixels of the destination (current) image.

4.8.5 Free Current

This command frees the memory associated with the current environment. It works only if the current environment is not the only one (otherwise, the program would have to terminate). Other measures which can free memory are described in section 10.1.

4.9 Show Image

This function displays the entire current image, shrinking it if necessary to fit into the screen, and removing extraneous elements like the title bar and tool bar.

The normal mode is restored by pressing any key on the keyboard or clicking a mouse button.

4.10 Delete File

Files may be deleted without having to leave Personal Paint. This may be used to remove old files which are not needed any more, or to rename a file, by deleting it and saving it again with the new name. The Amiga operating system offers more specific functions through its Workbench and Shell interfaces.

This function can delete any file accessible through the Amiga operating system. The standard file requester (3.4) is used to select the file. A warning message is displayed before the file is deleted. The operation can be aborted by selecting the Cancel gadget of either the file requester or the warning message.

This command can be used to delete any kind of file, regardless of its content. It may be used to remove pictures, parameter files, programs, etc. The command should therefore be used with caution.

If a Workbench icon is associated with the file to be deleted, it is removed as well.

If Amiga font files are deleted from the FONTS: directory, FixFonts should be executed from the system Shell.

4.11 Memory Information

This function displays a requester containing information on the amount of available RAM.

The requester contains different numbers. The displayed values are

calculated before the requester is displayed. In this way, the memory temporarily occupied to display the requester is not subtracted and counted as occupied. The unit for all numbers is the byte. Sections 1.3.2, 4.8.5 and 10.1 contain additional information on memory.

4.11.1 System Memory

The upper part of the requester contains nine numbers, divided into three columns of three rows each. The three rows are labelled: Chip, Fast and Total. The three columns are: Used, Free and Largest.

Memory Information			
Type	Used	Free	Largest
Chip:	582808	1513288	1483312
Fast:	2533280	1136704	1066456
Tot.:	3116088	2649992	1483312
Environment 1:	64000		
Environment 2:	62832		
Brushes:	28884		
Buffers:	15492		
Total:	171208		
OK			

Chip stands for Chip Memory, which is the portion of the system memory which can be accessed by the Amiga special-purpose custom chips. The custom chips are used, for example, to handle graphical data, like the contents of screens and windows. If there is not enough chip memory, some operations, like the opening of a requester, may fail. Section 10.1 explains how Chip memory can be freed.

All the remaining RAM is called "fast" memory. This memory is outside the range that the custom chips can access. It is called "fast" because the custom chips cannot access it, therefore the microprocessor does not have to wait if a custom chip is working with the same memory (this is called "bus contention").

The Amiga's memory is either Chip or Fast, therefore the sum of the two yields the Total memory. The Total row contains the sums of each column's Chip and Fast memory occupation numbers.

For each row (type of memory) there are three columns: Used, Free and Largest. The first number in the row indicates how much of the particular kind of memory associated with the row is already occupied. The second number tells how much memory is still available to be used by the Amiga operating system or other programs. The third number indicates the size of the largest chunk of free memory.

The Largest field deserves a more detailed explanation. The free memory is usually fragmented into several non-contiguous segments. For example, 200 kbytes of free memory may consist of a single chunk of 140 kbytes, another 50 kbytes long, and several other smaller chunks for a total of 10 Kbytes. If a program asks the system for a block of 200 kbytes, it will not get that memory. The available 200 kbytes cannot be merged into one single chunk, as other programs are using the memory

between the free chunks. It is possible that new Amiga operating systems, beyond the versions available at the time of writing, may take advantage of the features of the more powerful microprocessors mounted in the Amiga, making the operation just described possible. Currently, the only thing that can be done by the operating system in case of memory shortage is the freeing of some libraries, devices and other resources which are not currently used.

In a multitasking environment like the Amiga, it is possible that programs other than Personal Paint can allocate and free memory. Therefore, the displayed values represent only a "snapshot" of the current situation.

4.11.2 Program Memory

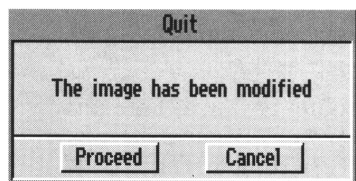
The lower part of the requester contains information about the memory currently allocated by the program's two environments (image memory), the maximum of nine brushes (plus one "brush restore" buffer) and other buffers (Undo tool, Stencil bitplane, Line and Area Pattern buffers).

The displayed values do not include the memory occupied by the program code itself or by its screens and windows.

The Total field is the sum of the other values. This total is already included in the data regarding the total system memory occupied, displayed in the upper part of the requester.

4.12 Quit

This command is used to terminate the work with Personal Paint. A warning requester can appear to list the items which have not yet been saved. The Proceed and Cancel gadgets of the requester can be used to confirm or cancel the command. If the choice is confirmed, the program terminates. The screen is closed, all memory and resources occupied by the program are freed.



It is good practice to always exit from all programs before switching the computer off or resetting the system (with the <Ctrl> + <Commodore> + <Amiga> keys).

5. The Brush Menu

Sections 3.1.1 ("Default and Custom Brushes") and 3.1.6 ("Define Brush") introduce some general concepts about the brush and how it can be used. This chapter explains in detail all the functions which can be applied to the brush to load it, save it, set the drawing mode, apply color changes, transform it or change the position of the handle.

A custom brush must be defined before most of the functions explained in this chapter can be used. Several menu items are automatically disabled (section 1.9.6 "Menus") when the current brush is not a custom brush.

5.1 Load Brush

This function is similar to Load Image (section 4.1), except that it loads the selected picture into the current brush. In most file formats supported by Personal Paint, there is no distinction between image and brush files. Some programs may or may not store additional information into the picture file (e.g. brush handle position or screen mode information), but this does not make the file less portable. Any picture can be loaded either as an image or a brush.

Loading a picture as a brush does not automatically change the screen mode (size, colors, interlace mode, etc.) Conversely, loading a picture as an image adapts the screen mode to represent the image better, but also limits the number of bitplanes to the maximum allowed by the Amiga system being used.

The screen format and colors are not changed when a brush is loaded. This may cause the brush to appear distorted (twice as wide or as tall as usual, etc.) over the underlying image, or with "random" colors.

If the brush has different colors from the current image, it is possible to apply the colors of the brush to the image palette (section 7.1.7), or vice versa (section 5.8.1). The former will only work if the image has at least as many colors as the brush. Otherwise, the image format can be changed manually to increase the maximum number of colors which can be displayed (section 4.5.3). Personal Paint offers a more "intelligent" way

Brush	
Load...	F5
Save...	F6
Print...	
Process...	A
Restore	B
Free	
Paint Mode	▶
Color	▶
Clipboard	▶
Resize	▶
Rotate	▶
Chop	▶
Outline	▶
Handle	▶

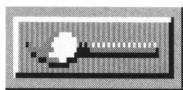
of dealing with images having different colors: the Color Merge function (section 7.6).

The fact that a brush can have more colors than the current image may be very useful. For example, Original and Enhanced Architecture Amigas cannot display 256-colors at the same time. Even on these systems, however, a 256-color brush can be processed, saved and printed without loss of data. The Chop Hidden Brush function (section 5.12.4) is most useful for cutting undesired parts of a very large brush. On screen, only as many bitplanes as are supported by the system are displayed. This generally gives an incorrect display of the brush (something which looks like "all colors wrong"). Internally, however, Personal Paint continues to process the original brush data, in up to eight bitplanes.

When the Copy Image Palette function (section 5.8.8) is applied to the brush, the image colors also become those of the brush. Otherwise, the brush retains its original colors in a separate color map (even if it has to be displayed using the current screen colors).

5.2 Save Brush

This function saves the current brush in exactly the same way that Save Image stores an image. The brush can later be reloaded as a brush or an image.



If the IFF-ILBM format is selected to save the image, additional information on the brush handle position and transparency is saved.

Saving parts which are smaller than the screen as brushes, rather than with the entire page which contains them, saves disk space. The "UIColors" files (section 1.14), for example, are better saved as brushes if they are stored on a limited capacity storage device like Personal Paint's program disk.

"UIColors" files are an example of a particular "tricky" file: they should be saved as brushes if it is necessary to save disk space, but it is easier to load them as images, in order to use the correct screen mode and colors immediately. These files should always be saved in the IFF-ILBM format, which for both images and pictures stores information regarding the appropriate Amiga screen mode. Actually, if saving storage space has the highest priority, the "UIColors" files could be saved as simple palettes (section 7.1.2) as well.

5.3 Print Brush

This function prints the current brush, in a similar way as the Print Image function which is described in section 4.3.

On Amigas employing chip sets prior to the AA release, images which have more colors (bitplanes) than are supported by the system can only be printed as brushes. Loading and printing such a picture as an image would result in a loss of quality (which may be very small, using the advanced options of Personal Paint), because the picture has to be adapted to the best available Amiga screen format.

The ratio of the current environment is used to print the brush. This may result in the picture being distorted (just as it appears on the screen - section 5.1), if the brush is taken from an environment having a different display ratio. The appearance of an image can often be improved by selecting the appropriate screen mode (section 4.5) before printing it. For example, a GIF image measuring 320 by 200 pixels may appear "squeezed" if printed from a low resolution 320 by 200 PAL-mode environment, while it might look better if printed from an NTSC screen with the same resolution.

5.4 Process Brush

This command applies Personal Paint's image processing functions to the current brush, as is described for images in section 3.1.4.

When a Dispersed, Clustered or F-S Type filter is applied to the brush, the color palette of the current environment is copied to the brush palette, since these dithering techniques employ the current foreground and background colors to simulate different color shades.

5.5 Restore Brush

This command undoes the last transformation applied to the brush (including a load operation), restoring its original appearance.

If an operation of the same class has been consecutively applied several times (e.g. a resize, rotation, transparency change, etc.), the brush is restored to the appearance it had before the first of such transformations was applied.

5.6 Free Brush

This function clears the current brush and frees all the associated memory resources. Since it cannot be reversed by Restore Brush, a warning message asks for confirmation.

5.7 Paint Mode

Different paint modes can be applied when using custom brushes. Each mode yields different results when a brush is pasted onto the image with the

Paint Mode	
✓ Matte	F1
Color	F2
Replace	F3
HBrite	F4

mouse. A different symbol on the title bar is associated with each setting.

Unless otherwise specified, the current background color is used for the entire brush when the right mouse button is used for painting.

5.7.1 Matte

In this mode, brushes are painted with their own colors. Areas defined as transparent are not copied. By default, these areas are associated to background colored areas when the brush is defined. Sections 5.8.5 to 5.8.7, and 8.14 explain how to further specify the areas which should be considered transparent.

5.7.2 Color

In this mode, the entire brush (except its transparent parts) is pasted in the current foreground or background color (depending on which mouse button is used.)

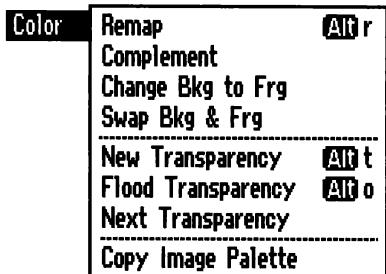
5.7.3 Replace

Like Matte, this mode paints with the individual colors of the brush. The brush transparency information is ignored.

5.7.4 HBrite

When Painting in Extra Half Brite screen mode (section 4.5), where 32 colors can be freely set and the other 32 are darker shades of the first 32, it is particularly useful to alternate quickly between the two associated states of a pixel.

This mode is similar to Color, in that all non-transparent brush pixels are treated in the same way. If the left mouse button is used for painting, all image pixels under the brush are turned to their darker HBrite color. Painting with the right button activates the lighter color of each pair instead.



5.8 Color

All items in this menu are used to apply color and transparency changes to the brush.

5.8.1 Remap

When a brush is loaded or imported from an environment having a different color palette, it may become necessary to render the original brush as accurately as possible

without disturbing the colors of the current image. While Color Merge (section 7.6) compares, changes, combines and mixes all colors of all pictures involved, Remap only changes the current brush.

Remap chooses the colors in the image palette which most closely resemble the original colors of the brush. Dithering and error diffusion are applied to the brush if the corresponding options have been activated (section 8.7). After a remap, the brush has the same number of bitplanes as the current screen.

5.8.2 Complement

This command exchanges the colors of the brush by selecting for each color position in the palette the complement of the binary number associated to that position. This may be useful, for example, for programmers to see how an image might look with Intuition's complement highlighting (which is used for gadgets, icons, etc.)

5.8.3 Change Background to Foreground

This function sets all background-colored pixels in the brush to the foreground color. It provides a very selective way of changing only certain colors in the brush.

When working on images rather than brushes, similar area-oriented results can be obtained by masking the color which is not to be changed (section 7.2.3) and then painting a filled rectangle (section 3.1.2.6) over the desired area.

5.8.4 Swap Background and Foreground

This command exchanges the brush's background colored pixels with those in the foreground color, and vice versa.

This function can be used, for example, to recolor Workbench icon images originally designed for 1.x operating systems for use in newer versions. To do this, the foreground and background colors should be set to the second and third color in the palette, respectively.

5.8.5 New Transparency

Each brush may have transparent areas which do not affect underlying parts of an image when pasting. The transparent area is defined by an additional bitplane which may either be associated to a particular color (e.g. the background color), or have a custom defined shape. This bitplane is loaded and saved with the brush in the IFF-ILBM file format.

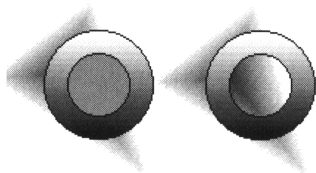
By default, this command redefines the transparent area, making it equal

to the parts having the current background color.

The setting of the Backfill Transparency option (section 8.14) determines whether, upon definition of a brush, its transparency is to be equal to the background color, or to the single-colored area which surrounds the brush. The New Transparency option makes it possible to apply the new transparency to an already defined brush.

5.8.6 Flood Transparency

The position of the brush handle, which can be set as explained in section 5.14, is used as the starting point of a "flood fill" operation which makes the selected area (i.e. group of pixels having the same color) transparent. The brush image itself is not modified: only the bitmap which defines the transparency is modified. Conversely, if the selected area is already transparent, it is made opaque again.



5.8.7 Next Transparency

As explained before, each brush has an associated bitplane which describes the areas to be considered transparent or opaque. Personal Paint allows the user to define and use up to nine different brushes at the same time. If the brushes have the same size, the transparency plane of one brush can be used for another brush.

This command applies the transparency plane of the next brush to the current one. In this process, empty brushes are skipped. If necessary, Personal Paint searches through all brushes, starting again with brush number one after reaching the last one.

By painting and defining a two-color brush with the appropriate size, it is possible to manually create a transparency plane to be used for another brush with higher precision than can be achieved with the normal background and fill transparency modes.

5.8.8 Copy Image Palette

When a brush is loaded or imported from an environment having different colors from the current one, it conserves its original color palette even if it has to be displayed in the current environment colors. This command resets the brush's internal palette and makes it the same as the current environment palette.

5.9 Clipboard

The Amiga operating system provides for a standard way of exchanging

data (mainly text and graphics) between one application and another, called the Clipboard. The content of the Clipboard is public, i.e. the data in it can be read and written by any program.



Thanks to the Amiga Clipboard, for example, the user can drag a Workbench icon on IconEdit, pass it to Personal Paint, edit it and go back and use IconEdit again to save the the new image as an icon.

If Personal Paint cannot open the Amiga Clipboard device ("clipboard.device" file in the system "devs" drawer), the functions which depend on it will not work.

Some incorrectly written programs may lock the Clipboard under certain circumstances. This may happen, for example, with text editors that expect the Clipboard to contain only text, or software that does not read the Clipboard up to its end, and therefore does not release the resource for use by other programs. The Empty Clipboard function can be used to prevent similar problems where they are known.

5.9.1 Read Brush

This command searches the Clipboard for graphical data. If a picture is found, it is copied to the current brush. The original data is not removed from the Clipboard.

5.9.2 Write Brush

This function places a copy of the current brush to the Clipboard, where it can be used by other programs (as well as by Personal Paint). Any data previously contained in the Clipboard will be replaced by the new picture.

5.9.3 Empty

This command clears the entire contents of the Amiga Clipboard, regardless of its type (graphics, text, etc.) This is useful in low memory conditions, especially if a very large brush which does not need to be used any more is still stored in the Clipboard.

5.10 Resize

The functions described in the following subsections modify the size of the current brush, which can be either a program default brush, or a custom (user defined) brush. The brush is stretched to the new size.

Section 8.15 explains how the Color Average Resize option affects brush resizing.

Resize

Stretch	Z
Smaller	-
Bigger	+
Halve	h
Halve Horizontal	
Halve Vertical	
Double	H
Double Horizontal	X
Double Vertical	Y

5.10.1 Stretch

This function stretches the brush to any size indicated with the mouse. When this function is selected, the mouse pointer changes to the stretch symbol to indicate that the brush stretch mode is active.

When the left mouse button is held down, the upper left corner of the brush remains "anchored", while the lower right corner reflects mouse movements, changing the size and shape

of the brush. The new size can be specified by clicking the left mouse button, moving the mouse and releasing the button.

If <Shift> is held down, the brush can only be resized in accordance with its original aspect ratio. This means that the image can be resized smoothly, but not distorted (i.e. made taller or wider).

5.10.2 Smaller

This command makes the brush smaller by the smallest possible step, maintaining the correct display ratio (i.e. X/Y proportions).

5.10.3 Bigger

As with Smaller, this function makes the brush slightly bigger.

5.10.4 Halve

This function halves the brush. The width and the height are halved, therefore the total brush surface is reduced to a quarter of the original brush.

5.10.5 Halve Horizontal

This function is a subset of Halve. Only the width is halved, while the height is left unchanged.

5.10.6 Halve Vertical

This function "flattens" the brush. The width is not varied, but the brush height is halved.

5.10.7 Double

This function doubles both the horizontal and vertical brush dimensions. The resulting brush will have four times as many dots as the original brush.

5.10.8 Double Horizontal

This function is a subset of Double. The brush is doubled only horizontally. While the width is doubled, the height remains the same.

5.10.9 Double Vertical

This function is a subset of Double. The brush is doubled only vertically. While the height is doubled, the width remains the same as that of the original brush.

5.11 Rotate

These functions perform various rotation operations on the brush.

Rotate	Any Angle	
	90 Degrees	z
	Horizontal Flip	x
	Vertical Flip	y
	Shear	

5.11.1 Any Angle

This command locks the lower left corner of the brush as soon as the left mouse button is pressed, and allows the entire brush to be rotated by moving the mouse pointer around. For speed reasons, an outline of the brush may be displayed while the rotation angle is defined.

5.11.2 90 Degrees

This function rotates the brush clockwise by 90 degrees. The horizontal and vertical dimensions of the brush are reversed. If the brush is square (i.e. if it is as wide as it is tall, in dots) the dimensions do not change.

The brush handle is repositioned in accordance with the rotation. If the function is executed four (or a multiple of four) times on the same brush, the resulting brush will be identical to the original brush.

5.11.3 Horizontal Flip

The same flip functions already described in section 4.7, which modify the content of the entire image, also exist for brushes.

This function transforms the image contained in the brush into its "mirror" image. The columns of dots, from the left to the right, which originally made up the brush image, are re-arranged in reversed order (from the right to the left).

5.11.4 Vertical Flip

This function, like Horizontal Flip, modifies the brush image. The brush is turned upside-down each time the function is selected.

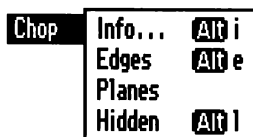
The effect of this function can be undone by repeating the function an

even number of times on the same brush. This is also true for Horizontal Flip.

5.11.5 Shear

This command is similar to a combination of Stretch and Rotate. It can be used to freely apply different levels of distortion to the brush. As in these former modes, the lower right corner of the brush can be freely moved while the left mouse button is held down. If the mouse is moved horizontally, the top of the brush remains still, while its left part remains anchored if the mouse is moved vertically. Combined mouse moves produce intermediate results. It's a bit like pulling a thin sheet made of rubber. Like many other image processing tools, this one is easier to see and use than it is to explain.

Holding <Shift> down restricts the mouse to moving along the axis in which it is moved first.

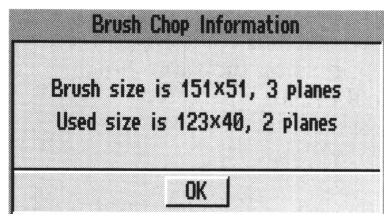


5.12 Chop

The items in this menu are used to examine and optimize the amount of memory used to store a brush.

5.12.1 Info

This requester displays information about the size and quantity of bitplanes actually used for the current brush, and the minimum size and number of bitplanes which could store the same brush without any loss of data.



This information is useful for checking whether some bitplanes are not even needed (for example, a brush may use only some of the very first image colors) and whether there are external transparent zones which could be removed. If more bitplanes than

necessary are used, or if border parts of those bitplanes are used to store transparent data, memory can be saved with the other functions in this menu.

5.12.2 Edges

This command cuts ("chops") all strips on the borders of the brush which contain only transparent pixels.

5.12.3 Planes

This function removes the last unused bitplanes of the current brush. For

example, if the second half of colors in the brush palette is never used, the last bitplane is removed.

The resulting brush palette will lose the information relative to the unused colors.

5.12.4 Hidden

This command removes all parts of the brush which are not visible (e.g. hidden by the title bar, tool bar or beyond the limits of the screen or those of the magnification window).

For example, to print only the central part of a 256-color brush which is larger than the screen, the brush handle would be placed at the center of the brush (section 5.14.4). Then, the brush would be moved towards a corner of the screen and this command would be executed by typing its keyboard shortcut. The remaining part of the brush could then be moved to the opposite part of the screen, where the other edges could be cut. Finally, the desired central rectangle could be printed.

Due to the visual interaction required to move the mouse and select the parts to be cut, this command should only be executed through its associated keyboard shortcut. Moving the mouse pointer to select the menu might cause unpredictable results.

5.13 Outline

These functions create different outline effects around non-transparent parts of brush, using the current foreground color. For three-dimensional effects, the light source is assumed to be on the top left of the brush, with shadows cast to the lower right.

Outline	Simple	o
	Square	
	Shadowed	
	3-D	
	Trim	0

5.13.1 Simple

This command draws a simple border around the brush, using the foreground color. No outline is added around corners.

5.13.2 Square

This effect is similar to the Simple one, but produces sharper edges.

5.13.3 Shadowed

This function is similar to Simple, but applies a border twice as thick as normal to the bottom and right edges of the brush.

5.13.4 3-D



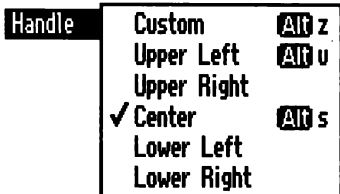
This effect adds a border in the current background color around the top and left of the brush, and uses the foreground color for the outline around the bottom and right edges. If a combination of light and dark colors is selected, the resulting brush will look like a raised object. Conversely, if the background color is dark and the foreground color is light, the brush will appear recessed.

5.13.5 Trim

This command removes the outermost circle of pixels around the brush (i.e. an outline 1 pixel thick). Technically, this is accomplished by temporarily inverting the transparency plane and using it to delete the pixels.

5.14 Handle

The handle of the brush is the position which is linked to the mouse pointer. It can be positioned anywhere (and may even be outside the brush). This is especially useful when working with large brushes.



The position of the brush handle is stored and loaded with the brush data when using the IFF-ILBM file format.

Some functions may automatically reposition the handle (e.g. brush rotation, resizing, etc.)

5.14.1 Custom

This option allows the user to freely define the brush handle position by clicking on the left mouse button, moving the mouse over the brush (which is temporarily anchored to the screen) and releasing the button when the pointer is over the desired position.

This command, combined with Flood Transparency (section 5.8.6), can be used to select the parts to be made transparent by "flood filling".

5.14.2 Upper Left

This option places the brush handle on the top left corner of the brush.

This brush position is the only one which is guaranteed not to be moved by a brush resizing operation.

5.14.3 Upper Right

This option links the brush handle with the top right corner of the rectangle which contains the brush.

5.14.4 Center

The brush handle position is placed at the center of the brush. If the center falls between two dots, the lowest of two dots on the same column, or the rightmost of two horizontally adjacent dots is selected.

This is the default initial brush handle position of Personal Paint.

5.14.5 Lower Left

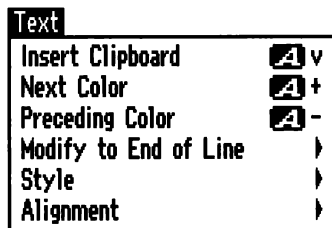
This option places the handle at the lower left corner of the brush.

5.14.6 Lower Right

This option links the brush handle with the lower right corner of the brush rectangle.



6. The Text Menu



Personal Paint incorporates a text editor to write text in the image area. The menu items described in this chapter become accessible during a text editing session, which is activated by selecting the Text tool and selecting a position on the screen. Section 3.1.3 describes the basic text editing and font selection functions.

6.1 Insert Clipboard

The Amiga Clipboard is used by several word processors, text editors and Amiga system functions. This command inserts a text stored into the Amiga Clipboard into the image area as if it were typed. Personal Paint correctly interprets ANSI SGR control sequences which may have been embedded in the text to control style and color variations.

Section 5.9 has more on the Amiga Clipboard. The following explanation on SGR sequences is more technical, and should be of interest to users wishing to edit a text with an external text editor.

SGR sequences are control codes which begin with the ESC + '[' characters (or by on single CSI code, decimal value 155) and end with a lower case 'm'. For example, SGR31 would indicate ESC+'['+'3'+ '1'+ 'm' ('3' and '1' are printable ASCII characters, not control codes). Normal text (or other control codes) may immediately follow an SGR sequence. Some of the most used SGR sequences are:

From SGR30 to SGR39: set text color

From SGR40 to SGR49: set background color

SGR0: restore plain style

SGR1: begin bold text

SGR22: end of bold text

SGR3: begin italics

SGR23: end of italics

SGR4: begin underlining

SGR24: end of underlining

6.2 Next Color

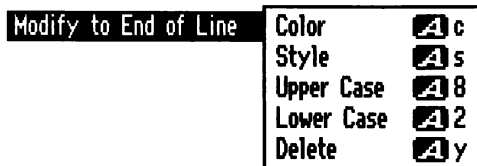
This command selects the color in the palette which follows the current color as the new foreground color. The new color is used for all the text

which is going to be typed, regardless of the position of the text and the other colors which surround it.

Color changes to entire lines of text can be applied with the Recolor to End of Line function (section 6.4.1).

6.3 Preceding Color

This function is similar to Next Color, only that it selects the previous color in the palette. Both commands are equivalent to the paint mode keyboard shortcuts (<[> and <]>, by default) which can be used to select the preceding or next color. However, the latter one-key shortcuts would insert a character, rather than execute a command, in a text editing session.



6.4 Modify to end of Line

This group of commands applies changes to the text between the current cursor position and the end of the line.

6.4.1 Color

This function applies the current foreground color to the text.

6.4.2 Style

This function applies the current text style (like italic or bold) to the text. The style must be specified before this command is executed.

6.4.3 Upper Case

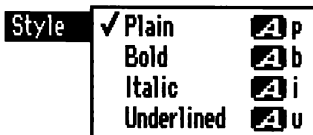
This command converts all characters between the cursor and the end of the line in their upper case (capital letters) form.

6.4.4 Lower Case

This command transforms the selected characters into lower case.

6.4.5 Delete

The text from the current cursor position to the end of the line is deleted.



6.5 Style

Several menu items can be used to select the desired character style (plain text, italic, bold, etc.)

The new style is applied to all text which is written after the style selection. A checkmark is displayed to the left of the menu items associated to the current style. Style variants can be combined for effects like ***italic bold underlined***.

The style of text which has already been typed can be modified with the Restyle to End of Line function (section 6.4.2).

When a new style is selected, Personal Paint first tries to find a font variant of the current typeface having the desired attributes. If no such font exists, it is algorithmically generated from the current font.

Sections 3.1.4 and 5.13 explain how to apply other effects to text, like blurring and outlines.

6.6 Alignment

The text can be aligned and realigned in different ways (left, center or right). This command always changes the alignment of the entire text which is displayed by the current editing session.



Since Personal Paint does not use explicit text margins to delimit the text editing area, the texts are aligned or centered along the vertical line which passes through the position where text editing started. The entire text (and the associated alignment line) can also be repositioned by "grabbing" it with the right mouse button. The text can be rearranged with great freedom by combining a change in alignment with an appropriate new text position.



7. The Color Menu

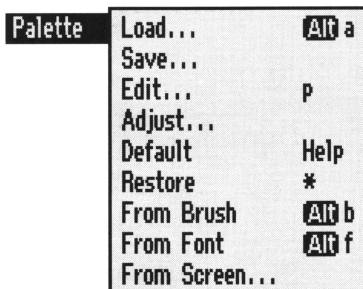


In a paint and image processing program like Personal Paint, color is everything. Or, at least, nothing could be done without color. An appropriate choice of colors can make a 64-color image look like a photograph, give life to a faded picture, or reduce an image's memory consumption to a fraction of the original, without significant loss of detail.

The items in the color menu allow the user to access and modify single colors, as well as apply global color changes. Color palettes can be loaded, saved and exchanged between objects.

7.1 Palette

A *palette* is the entire set of colors associated to an image. It is similar to a painter's palette, which contains many different colors that can be used together. On the Amiga, the more colors are used, the more resources are needed to process and store an image. Section 1.3.2 explains the relationship between the image size, number of colors and memory. The maximum number of colors in a digital palette is always a power of two (2, 4, 16, 64, 256 etc.)



Different pictures may require special colors, and at the same time may not use some colors which appear very often in other pictures. Although palettes having a wide range of different colors (256 colors, for example) may come very close to fulfilling the needs of most pictures, there may still be good reasons for using palettes with more limited numbers of colors.

Using a palette of well selected colors for each picture not only saves memory and reduces processing time, but also serves the cause of consistency and style, especially if several pictures must share the same "atmosphere".

7.1.1 Load Palette

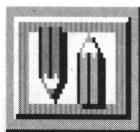
Color palette information is stored with all pictures, regardless of the storage format which is used (except for some two-color formats where black and white is implied). A color palette can also be saved alone: the file, instead of containing an image plus a palette, will contain only a palette.

Load Palette will find and load the color palette from different types of graphic files (GIF, IFF-ILBM, PCX, etc.), both with or without image. The new palette will become the palette of the current environment. If the current screen mode has more colors than the palette which is specified, then only as many of the first colors as exist in the new palette will be changed.

As with other functions which modify the palette, the original palette can be restored invoking Restore Palette (section 7.1.6).

7.1.2 Save Palette

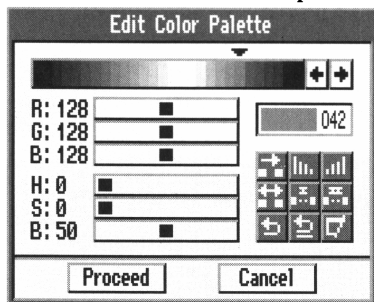
This command stores the current color palette into an IFF-ILBM file (the BMHD, CMAP and CAMG IFF chunks are written). This is a standard and space efficient way of storing color information, which can be loaded again with Personal Paint, or by other software.



This command can also be used to overwrite the original "UIColor" files which define Personal Paint's default menu colors in the "PPaint_Prefs" disk. This will save about 5 kbytes of disk space (which may be precious, on floppy disks), since the "UIColor" files are originally stored as images containing a painted menu and requester to ease editing. A copy of the original user interface color files should however also be kept stored for possible future editing requirements.

7.1.3 Edit Palette

This requester allows the user to individually set each color in the palette with the maximum precision allowed by the current screen mode. There are also functions to copy, swap and sort colors and create new ranges of colors.



Experimenting with colors, it may sometimes happen that the entire screen becomes invisible, i.e. all items on the screen have the same color. The <Help> key can be used to restore the default colors of Personal Paint for the current screen mode.

Depending on the current color palette,

Personal Paint may use different colors to draw the user interface. The choice for these colors is determined by legibility, contrast, and "3-D look" parameters. The colors external to the requester are updated as soon as the mouse pointer is moved outside the palette requester.

7.1.3.1 Picking a Color

The topmost row of colors shows the ordered sequence of palette colors. An arrow-sign appears over the current color. Upon display of the requester, this indicates the current foreground color. If the palette has more colors than can be shown in a line, two scroll-gadgets are displayed to the right of the color-bar. Clicking on one of these gadgets, or keeping the gadgets clicked for a longer time, shows more colors in the selected direction.

In "Extra Half Brite" video modes (64 colors), only the first 32 colors of the palette can be defined freely. The remaining 32 are automatically rendered using darker shades of the first 32. The palette requester therefore only allows the user to edit the first 32 colors.

The current color can be selected by clicking on it with the mouse (left button). It is also possible to select a color outside the requester, either in the image or in the main palette. The <Left> and <Right> cursor keys respectively move the current color to the previous and next color in the palette.

A small box below the row of palette colors indicates the current color both by displaying a rectangle painted with that color, and by showing the position number of that color within the palette (for example, the number can range from 0 to 15 in a 16-color map).

7.1.3.2 RGB and HSB Color Models

The current color can be modified using the sliders (knobs) which appear below the row of colors. Two different color models (or coordinate systems) can be used to specify a color: RGB (*Red, Green, Blue*) and HSB (*Hue, Saturation, Brightness*). The two sets of knobs give a different way of accessing the same color space. Either one of the two sets of knobs can be used independently from the other. All possible colors can be obtained by manipulating only one set of knobs.

In the RGB model, a color is described as a combination of three primary colors: red, green and blue. The intensity of each color is specified by a number in the range from 0 to the maximum, which may vary depending on the screen mode and the version of the Amiga custom chips. In most modes of Original and Enhanced Amiga sets, red, green and blue can have 16 different intensities. This means that a color may be picked from a set of 4096 different colors (16 to the 3rd power). Some ECS video

modes, the A2024 mode and other modes have less (e.g. four) intensity levels, leading to fewer (e.g. 64) possible colors or gray levels. On Advanced Graphics Architecture Amiga systems, most video modes can handle 256 intensity levels for each primary color. 256 to the power of three gives 16 777 216 possible combinations (so that's where the famous "16 million colors" comes from). Section 1.14 explains how "UIColor" files with different "granularities" are used for this reason.

Theoretically, if the three primary colors had equal intensity, the perceived result would be a pure gray ranging from white to black.

In the HSB model (also called HSV, from Hue, Saturation and Value), a color is described as a position on a *color wheel*, plus a brightness value. This abstract color wheel is a sort of a circular rainbow. On the perimeter of the circle, pure colors (red, green and blue) respectively appear every 120 degrees (i.e. one third of a circle). The circle begins and ends with red. Intermediate position values correspond to intermediate colors. The colors are completely visible around the perimeter of the circle, and slowly fade out towards the inside of the circle. The center is completely gray (from white to black, depending on the brightness).

The Hue parameter specifies the angular position of a color on the wheel: 0 (or 360) = red, 60 = yellow, 120 = green, 180 = cyan, 240 = blue, 300 = magenta, etc. Saturation indicates the distance of the color from the center of the circle, in the range from 0 (gray) to 100 (pure color). Brightness specifies the overall intensity of light (as opposed to the specific color intensity, which is determined by its saturation). A brightness of 0 is always black. 100 indicates the maximum possible brightness for each particular hue/saturation combination.

7.1.3.3 Copy Color



To copy a color which already exists in one position in the palette to another position, it is sufficient to select the first color, click on the Copy Color gadget, and select the destination position.

7.1.3.4 Swap Colors



This is similar to Copy Color, except that the destination color is not overwritten, but exchanged with the first color.

7.1.3.5 Sort Colors

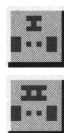


These gadgets sort existing colors in positions from the current color to the color which is selected after the Sort Colors gadget. Two types of color sorting exist: from the lightest color in the range to the darkest one, and from the darkest to the lightest.



7.1.3.6 Create Range

These two gadgets create new colors in the position between the current color and the color which is selected after the gadget. The first (left) gadget picks colors at intermediate Red, Green and Blue component positions, while the second calculates the intervals in the Hue, Saturation and Brightness system.



7.1.3.7 Undo

The Undo Last Change gadget undoes the last editing action in the palette requester, while Restore All restores the initial settings.



7.1.3.8 Hide Requester

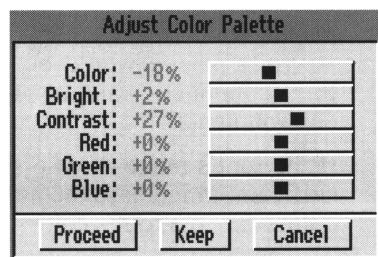
While this gadget is selected, the requester disappears (only as long as the left mouse button is held down), making it possible to view those parts of the image which may normally be hidden. If the right mouse button is pressed while the left button is held down, the current color "cycles". Both options are very useful for verifying the possible effects of color changes without leaving the requester.



7.1.4 Adjust Palette

This requester allows the user to apply global color changes to the current image. This is particular useful when processing for the first time an image which has been scanned, or before printing an image (colors generated by scanning and printing devices may differ from the colors which are displayed, and may therefore require some sort of adjustment).

With the six sliders, it is possible to completely remove, double or apply intermediate changes to particular color components. All colors in the palette are affected by the changes. The Edit Palette requester (section 7.1.3) must be used to individually modify selected colors. In "Extra Half Brite" video modes (sections 7.1.3.1), the first 32 colors are changed directly, whereas the second 32 always represent darker variations of the first 32.



From top to bottom, the sliders respectively affect the color, brightness, contrast, red, green and blue components. Adjusting the color is equivalent to modifying the saturation value in the HSB model (section 7.1.3.2). The contrast knob reduces or increases the distance of the RGB levels from the median values.

The Keep gadget resets all sliders to the central position after applying

the selected changes. This allows the user to apply changes which more than double some values, or select a particular order in which to apply the changes (by default, the adjustments modify all colors in order indicated by the sliders).

Pressing the <Help> key clears all correction factors, bringing the sliders back to 0%.

7.1.5 Default

This command changes all colors to Personal Paint's default palette. This palette may either be the program's internal one, or a color palette file referenced in one of the the "Startup" files (section 8.1.1 and Appendix C).

By default, the associated shortcut key for this function is <Help>.

7.1.6 Restore

This command cancels the last changes made to the color palette, restoring the colors previously used. It can be invoked twice to restore a Restore operation.

7.1.7 Copy Brush Palette

This function copies the colors of the current custom brush (the one whose number appears in the tool bar) to the current environment palette. If the brush has fewer colors than the image, or vice versa, only the first colors are copied.

7.1.8 Copy Font Palette

Color fonts (section 3.1.3.2) are generally created using a specific color palette which makes them appear best. In these cases, using the font with a wrong palette would be inappropriate. After loading the desired font, this command can be used to apply its palette to the current environments.

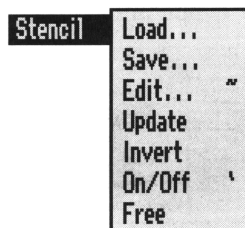
If the font's range of colors is too limited for the remaining artwork, it is sufficient to increase the number of colors (section 4.5.3), leaving the first colors (i.e. the font's colors) unchanged.

7.1.9 Copy Screen Palette

This function copies the colors of the selected screen to the current environment, without grabbing the screen. The selection of the screen works as in the Grab Screen function, described in section 4.4.

7.2 Stencil

A digital stencil (or color mask) works in a way which is similar to the sheet of paper or metal with shapes which are cut to define where to let the ink through. When a stencil is defined or loaded, a new bitmap is created in addition to the existing image bitplanes. This concept is somehow similar to the transparency plane, described in section 5.8.5. The Stencil bitmap contains information about which parts of the image should be protected from painting operations. Where there are ones, the underlying image pixels are "protected", where there are zeros all paint operations will work normally.



A stencil is usually defined in one of two ways: by selectively protecting all areas having a certain color (*color-masking*), or by painting a two-color image, color-masking it and then loading it as a stencil. Even if the stencil was originally defined by color masking, it is immediately transformed into a bitmap. This means that Personal Paint does not protect certain pixels because they appear in a certain color, but because there is a one in the corresponding stencil plane.

The similarity with the brush transparency plane, which was mentioned before, may become a confusing equivalence at the file-format level. The IFF format specifications use the same bitplane to provide both brush transparency (unless the transparency can be algorithmically defined) and image stencil information. When a picture with such an additional bitplane is loaded as a brush, this bitplane would be interpreted as the transparency plane, while loading the picture as an image would also load the data as a stencil (and activate that stencil).

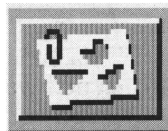
7.2.1 Load Stencil

This command loads the data stored in a stencil or picture file. In the IFF-ILBM format, stencil data is always stored with an image if there is an active stencil when the image is saved.

The size of the stencil should be equal to the image size. If the stencil is larger, it is cut; if it is smaller, parts of the image (the lower and right strips missing in the stencil file) will not be protected.

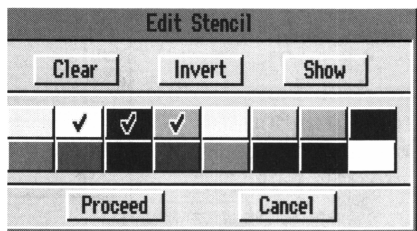
7.2.2 Save Stencil

The stencil plane which was last used in the current environment is saved in a standard IFF-ILBM stencil file. The IFF chunks which are written are: BMHD, CAMG and BODY.



7.2.3 Edit Stencil

With this requester, it is possible to create a stencil bitmap by associating the areas to be protected to particular colors. Subsequent painting operations will not change pixels associated to colors which appear checkmarked in the requester.



The stencil plane itself is not updated by painting commands, which may, for example, create new areas in the colors originally protected by the stencil. The Update Stencil command (section 7.2.4) should be used for this purpose.

The protection status of a color can be set by clicking on a color box, or picking a color from the image with the left or right mouse button (to select or deselect that color). Checkmarks indicate the colors which are protected.

The Clear gadget removes all checkmarks (such a stencil would be equivalent to not having a stencil). Invert reverses the on/off status of the colors. Show removes the requester while the left mouse button is held down on the gadget, showing masked areas in black and other areas in white.

When a custom brush is defined (section 3.1.6), only those pixels which are not masked by the stencil are picked. It is also possible to create a stencil by drawing it in two colors as an image, and then mask one of the two colors with this requester.

Section 3.1.4 mentions a case in which a stencil can be used to protect certain colored areas of the screen from image processing operations.

The two program environments have independent stencil planes.

7.2.4 Update Stencil

Normally, a stencil defined as a color mask is defined using the Edit Stencil requester. Areas which have a particular color may be masked with that requester, but are not extended when new colors are painted to the image. This command forces an explicit update of the stencil bitplane after new colors have been added.

7.2.5 Invert Stencil

This function inverts masked stencil areas with unmasked areas. If the stencil was defined as a color mask, this command has a similar effect as Invert in the Edit Stencil requester. However, if the stencil was originally created by drawing it (and is therefore independent from any particular

image colors), only Invert Stencil can be used without resetting the stencil.

7.2.6 Stencil On/Off

This command turns the stencil mask on or off. If the stencil is switched on for the first time, the Edit Stencil requester appears. Even if the stencil is switched off, its bitmap is preserved.

A symbol is displayed on the title bar to indicate that the stencil is active.

7.2.7 Free Stencil

This function switches the stencil off and frees the stencil bitplane. After this command is executed, a stencil must be redefined or loaded to be used again.

7.3 Remap

Sometimes, the colors of an image may be changed even if this is not desired. This may happen, for example, after applying font or brush colors to the current image, or after manually changing some colors or simply replacing the positions of some colors in the palette. After such an operation, the image which is displayed may have "all colors wrong".

The Remap command uses the current colors to make the image look as much as possible like it appeared with the previous set of colors (which may still be used invoking the Restore Palette function). If the same color exists in both the original and the new palette, Remap simply updates all references to that color's position in the palette. If some of the old colors do not exist in the new palette, Personal Paint may either choose the closest colors, or apply Dithering, Floyd-Steinberg, or other more sophisticated remapping techniques, as specified in the associated program options (section 8.7).

7.4 Change Background to Foreground

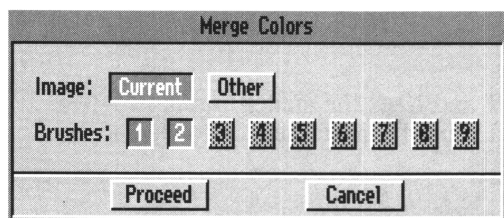
This command applies the foreground color to all background-colored pixels in the image. It is similar to the same command which can be applied to brushes (section 5.8.3).

7.5 Swap Background and Foreground

Like the previous command, this function exchanges the colors of background and foreground colored pixels.

7.6 Merge

It is often necessary to mix different images, or parts thereof, into a single picture. For example, this may happen when a scanned photograph is overlayed over a digital background, when pasting a brush originally defined in a different environment, or if more than one reduced image is to be shown on the same page. All these cases may have one common problem: if the elements which must be joined have different color palettes, the majority of pixels may appear to have the wrong colors.



With this function, it is possible to selectively merge the color palettes of all brushes and images currently in use. As a result, one single palette is created for all the selected items. The final palette has the same number of colors as that of the current environment.

The colors are carefully chosen, but it may nevertheless happen that there are not enough colors to correctly represent all individual pixels of all images and brushes. For this reason, when all items are remapped to the new palette, dithering, Floyd-Steinberg or other error diffusion algorithms may be employed, as indicated in the relative program setting (section 8.7). Section 8.6 describes different methods of color reduction.

To preserve as many of the original colors as possible, it may be appropriate to increase the number of colors of the current image (section 4.5.3). If all the items to be merged had completely different colors, the resulting map should have as many colors as the sum of the individual palettes. Fortunately, Personal Paint's color quantization, remapping and reduction algorithms are so advanced that it is often hard to notice any difference between the original items and the final image, even if heavy color reduction has to be applied.

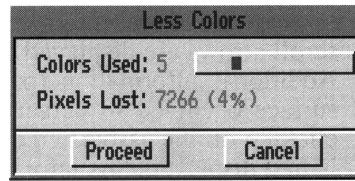
For example, if an image with a 16-color palette, of which only 8 are used, is merged with an 8-color brush, no colors are lost. Both the image and the final brush will have a 16-color palette.

After the selected items have been color-merged, they can easily be pasted as necessary.

7.7 Less Colors

This function allows the user to reduce the number of different colors which are used in the current image. The slider which is displayed in the requester allows the user to specify the desired number of colors, in the range from 2 to the amount currently in use. If two or less colors are used, it would not make sense to further reduce the number of colors.

As the slider is moved, the picture is updated to show the changes, while the Pixels Lost field informs the user on the relative (percent) and absolute value of the amount of pixels which had to be "sacrificed". In qualitative color reduction (section 8.6.1), colors for which there are similar colors in the palette are eliminated first. If the quantitative color reduction is selected (section 8.6.2), less used colors are the first to be suppressed.



If one or more colors appear more than once in the palette, it is possible to reduce the number of colors used by simple remapping, without any loss of visual information.

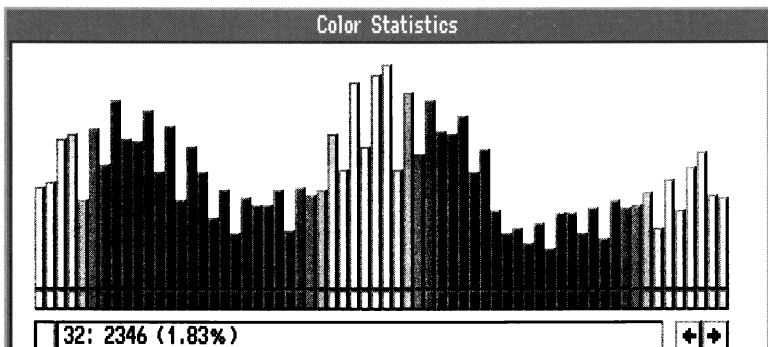
Color reduction is a quite computation-intensive process. The higher the number of destination colors, the more time it will take to reduce the image. For example, on Amigas based on the 68000 CPU, it may take some time every time the slider is moved, if the number of destination colors is higher than 32.

In "Extra Half Brite" modes (section 7.1.3.1), Personal Paint always maintains separate blocks of light and dark colors in the palette. A HBrite palette has always an even number of colors, with the group of darker colors starting 32 bytes from the beginning.

This command does not explicitly reduce the number of color entries in the palette; it only reduces the amount of colors used in the image and groups the colors which are used in the first palette positions. The desired number of palette colors can be specified in the Screen and Image Format requester, as explained in section 4.5.2.

7.8 Statistics

This requester displays statistics on the colors used in the current image.



For each color in the palette, the program counts how many pixels exist in the image, and displays the result in the form of a histogram.

If there are more colors than can be represented in the requester, two scroll arrows are displayed to scroll the histogram in the desired direction. Additional information (palette color position, amount of pixels used, surface occupied in percent) on a particular color can be displayed by clicking on the associated color bar in the histogram. When the requester is first displayed, this information refers to the current foreground color.

8. The Settings Menu

All the functions described in this chapter deal with program and environment settings (parameters). The former are common to the entire program, while the latter may be different for each of the two images (section 4.8).

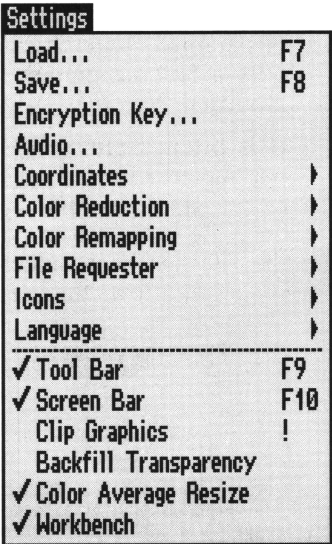
8.1 Load Settings

Most settings of Personal Paint can be saved to a file. This includes settings defined in other program menus or requesters (printer options, screen and image size, etc.)

The standard file requester, described in section 3.4, is used to select the file to be loaded. By default, the drawer where the program loads and saves parameter files is "PPaint_Prefs", in the "PPaint" volume.

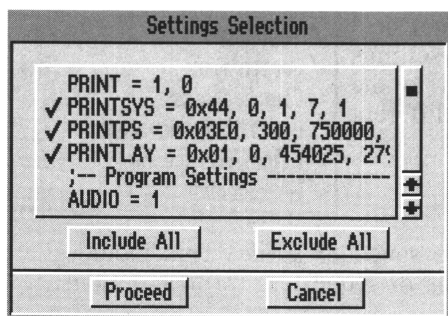
As described in sections 1.14 and 4.8, Personal Paint has two environments. Each of the two has a full set of settings (mostly image-oriented) completely independent from the other environment. The program settings, however, are shared by the two environments. When a parameter file is loaded, it affects the program settings used by both environments, but only the environment settings of the current environment. If a single file contains some environment settings which are to be applied to both environments, that file must be loaded two times (once from each environment). The "Startup_1.set", "Startup_2.set" and "Startup_A.set" files in the "PPaint:PPaint_Prefs" drawer contain initial settings for the two environments. Personal Paint automatically tries to load these parameter files when the program is started. "Startup_A.set" is generally defined by the disk configuration procedure (section 1.12), and contains a few program settings.

A parameter file may contain user interface settings, page and printer setup for a particular printer, screen mode information, or just a reference to a useful color palette (if one is found in a "Startup" file, that palette becomes the default palette).



Personal Paint does not put a minimum or maximum limit to the number of parameters which can be set in a file. If the file being loaded contains only a few assignments, only the settings referenced in the file will be modified. No other program or environment settings are changed.

It is often useful to extract and use only a few settings from a longer parameter file. If, for example, a file contains definitions for image colors, audio volume, page layout and image processing functions, but only the latter are to be loaded, the parameters must be "filtered". After the file has been selected with the file requester and loaded, a second requester allows the user to select or discard some or all settings.



The requester contains a standard scrolling list, which displays all lines of the loaded file. A checkmark before each line indicates whether that line (and the parameters it contains) should be accepted or not. Wherever there is a checkmark, the corresponding program settings will be changed. Clicking on a line cyclically sets or removes the checkmark. The Include All and Exclude All gadgets can be used to quickly select or discard all parameters.

Only the parameters associated with the checkmarked lines are read. All other parameters in the file are skipped. This makes it possible to selectively load only part of the parameters in a file, without affecting other settings.

The file may include empty lines, or lines beginning with a comment introducer (semicolon, ';'). Checkmarked or not, these lines are always skipped by the program.

If an error is found in the selected parameter file, or if the new settings cannot be applied (e.g. no Chip RAM for a selected screen format), all parameters are ignored and an error message is displayed. Syntax errors are unlikely if the parameter file was written by Personal Paint, but are possible if the file was typed or edited by hand. Appendix A explains the possible error messages.

8.2 Save Settings

This function is the opposite of "Load Settings". The current environment settings and the program settings can be saved to a file to be loaded again when necessary.



A requester which allows the user to select which parameters are to be saved is displayed. By default, all program and

environment settings are included in the file. As explained in section 8.1, the checkmarks to the left of each line of parameters may be set or removed by clicking on the line. Only the lines which have a checkmark are included in the file.

As a rule, all parameters which are out of the scope of that particular settings file should be excluded. A file intended to contain some interesting image processing functions, for example, should not contain printer or audio feedback settings. This simplifies future applications of the files.

When preparing one of the "Startup" files, it is sufficient to put program settings in only one of the files (generally in "Startup_1"). When Personal Paint is loaded, the startup settings files (if any exist) are read in the following order: "Startup_A", "Startup_2" and "Startup_1". In case of duplicate definitions of the same setting, the last definition which is read is the one that counts.

The standard file requester (section 3.4) is used to specify where the file is to be saved, and with what name. As described in section 8.8.6, a warning message can be displayed if a file with the same name would be overwritten by the new file.

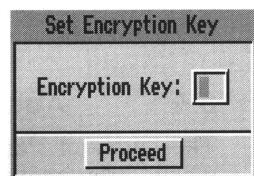
A settings file is a plain ASCII text file. When Personal Paint stores such a file, it uses only a minimum of comments, spaces and empty lines to make the file more readable (for the user). If a word processor or text editor is used to write a parameter file, and the same file is then loaded and saved again by Personal Paint, comments, additional spaces and new lines are stripped. Lower case letters in variable names are converted to capital letters.

If a settings file is created or edited manually, some syntax rules should be followed. The file must begin with a "PPAINT SETTINGS" line. Optional comments may begin with a semicolon (;) and end at the end of the line. Combinations of both Horizontal Tab and Space characters (ASCII decimal codes 9 and 32) are allowed as separators. Existing settings files and appendix C are a useful reference.

8.3 Encryption Key

The use of the encryption key in the context of loading and saving files is described in sections 4.1 and 4.2.

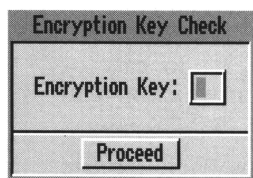
This requester is used to set or modify the encryption key. The last key which was written remains stored (but unreadable) until a new key is written, or Personal Paint is terminated. The encryption key is cleared whenever the requester used to write a new key is displayed. The requester can be used both for writing a



key, or for quickly clearing the last used key.

Only two characters at a time are displayed in the string gadget of the requester. This prevents the "casual" observer from reading the entire key from the computer screen. Capitals and lower case letters are treated differently (i.e. "Key" is not the same as "key"). The maximum length of the key is 49 characters.

If the Proceed gadget is selected immediately after the requester is displayed, no encryption key will be present in the computer's memory. No Cancel gadget exists, so it is impossible to re-use the previously written key, unless it is written again.



After the key has been written once, Personal Paint displays a second requester to write the same code again. In this way a mistyped key cannot be used by mistake to save an image, which then could not be loaded again using the correct key. An error message is displayed if the control key is different from the first key.

It is important to note that the encryption key is not a simple access code, but is used to greatly modify the image data. It will be impossible to read the data with any program, unless the correct key is used. The proprietary Cloanto two-phase encryption algorithm (encryption is applied to compressed data) is a guarantee for data security.

It is theoretically possible for an unauthorized person to load an encrypted file by "guessing" the right key, or trying all most likely keys until the right one is found. It is also likely that powerful computers will be used to try all possible keys (character combinations). This can take hundreds of years, but also much less. Some care should be taken in advance to avoid such a risk. The key must never be written down. The key should be long (at least 8 characters). Letters, numbers and other characters should be mixed in the key. Names and dates are often too obvious for an encryption key.

Cloanto's Personal Write word processor, through its encryption functions, has won a reputation and is widely used for preserving private information and important secrets. Newer Amigas with almost photographic-quality 256-color video modes, combined with lower-cost color scanners and Personal Paint's encryption facility can provide similar protection to images. Confidential Polaroid photographs, documents and other material may be destroyed or stored to a most secure place after the digital copy has been encrypted.

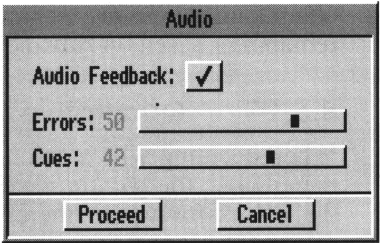
8.4 Audio

The audio of Personal Paint consists of the sounds which are emitted when different functions are selected. The audio is stereophonic. This

means that all sound signals are emitted in different ways on two audio channels.

Two sliders can be used separately to set the volume of error and cue sounds. The cue signals are sounds emitted when a key is hit, or a gadget or menu item is selected. All other sounds are error (or warning) signals.

A number to the left of each knob indicates the volume level. This can range from 0 to 64. By default, the volume of error sounds is higher than that used for other sounds.



As explained in sections 1.11 ("Loading Personal Paint") and 1.13 ("Installing Personal Paint"), the audio only works if the program can activate the CloantoAudio unit. If the Audio Feedback option is disabled, and no other program is using the audio module, CloantoAudio does not occupy any RAM.

8.5 Coordinates

These options activate the display of mouse pointer coordinates on the title bar. The point of origin is always the top-left of the screen, and may be equal to 0:0, or 1:1, depending on which subitem is selected. In the first case coordinates start from zero, otherwise counting starts from one.



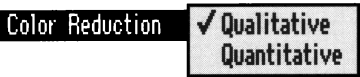
A double arrow precedes absolute coordinates (i.e. "normal" ones, from the top left of the screen), while relative coordinates are introduced by a single-headed arrow, which also indicates the direction of the pointer from the origin (e.g. during the definition of a brush).



Each environment may have its own coordinate settings.

8.6 Color Reduction

Color reduction is the process of transforming an image into a second image having a palette with fewer colors. This involves deciding how to best represent the colored areas of the original image. Through dithering and error diffusion (section 8.7) color remapping, it may be possible to use Personal Paint's default palette to emulate the original colors. However, considerably better results can be achieved by using a selection of the original color palette. The following subsections explain different options which are available.



After the new colors have been chosen, the appearance of the color-reduced image may be further improved by an appropriate color remapping method (section 8.7). Section 10.4 discusses some compatibility issues regarding palettes, color reduction and color remapping based on Advanced Graphics Architecture Amiga systems.

8.6.1 Qualitative

When deciding which colors of the original palette should be used in the new image, the *qualitative* color reduction method gives more priority to the colors for which there are not so many similar colors (and which would therefore be represented not so well using the other colors). It tries to preserve color variety and diversity, while limiting the loss of hue-information.

This type of color reduction may produce several new colors which did not exist in the original palette, but which are the result of accurately "merging" more source colors into one destination color.

This works particularly well on pictures having lots of colors, like some digitized photographs and computer graphics.

8.6.2 Quantitative

The *quantitative* (or *popular*) color selection method gives priority to the colors which are most used. It does so by creating a new palette which contains only the most used colors of the original image. The new colors are a subset of the original colors.

This works very well on pictures whose colors have a similar hue (section 7.1.3.2), like gray-shaded images and images based on two-color spreads (e.g. many banknotes).

8.7 Color Remapping

Color remapping is the process which has to be applied when rendering a colored area in a different environment (where the original color may not be available). The simplest method would be to pick the "closest" color in the new environment. Other techniques combine existing colors in different ways to simulate the original colors.

Color Remapping

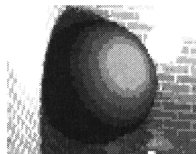
Simple
Pattern Dithering
✓ Floyd-Steinberg

Color remapping may automatically be applied by the program after color reduction when an image is loaded or color-reduced. The palette which is generated by the color reduction algorithm is not influenced by the selected color remapping technique. This means that the same image, remapped in different ways, will always have the same color palette. This

may be useful when different images with the same source palette (but possibly remapped in different ways) have to be pasted together on the same page.

8.7.1 Simple

This is the most immediate (and fastest) color remapping method. Where no color exists in the new environment, the closest existing color is used. Existing pixels are simply remapped to a new color (if necessary). The arrangement of pixels is not changed, even if some pixels may be "lost" (as would be the case if two adjacent pixels originally having different colors were remapped to the same color).



This method is excellent, for example, for quickly loading and viewing 256-color images on systems which cannot display so many colors. From a qualitative point of view, simple color remapping could be adequate for remapping already "artificial" colors (e.g. in charts, histograms, etc.).

8.7.2 Pattern Dithering

Pattern Dithering refers to the process of representing certain colors (e.g. orange) with a constant pattern of other colors (e.g. red and yellow). Section 4.3.2.1 has an interesting introduction to dithering applied to printing.



This process is quite suitable for remapping images containing larger areas of the same color and simple transitions of gray or color. The human eye is very good at recognizing regular patterns of dots, so the image will look better from some distance.

8.7.3 Floyd-Steinberg

Floyd-Steinberg is a more sophisticated, higher quality method of dithering. It employs special error diffusion techniques to distribute pixels of different colors without creating noticeable patterns.



Floyd-Steinberg can generally represent more colors and softer shades than the other color remapping methods. It may also be considerably slower than other techniques.

To give an example of the capabilities of this method, it is interesting to note how a 256-color image (320 by 200 pixels) may look better in high resolution (640 by 400) with only 16 colors using Floyd-Steinberg, than it would look in 64 colors (320 by 200 format) with a different color remapping.

8.8 File Requester

This group of settings allows the user to control some aspects of the file requester (section 3.4). Each parameter is associated with a menu subitem which can be selected and deselected with the mouse (section 1.9.8, "Menus"). The following subsections explain each parameter in detail.

File Requester

- ✓ Expand Path
- Directories on Top
- Sort by Date
- ✓ Double-Click
- ✓ Confirm Overwriting

8.8.1 Expand Path

This parameter determines whether the program can modify the content of the "Path" string gadget of the file requester.

If the option is enabled (as it is by default), Personal Paint transforms device names (e.g. "DF0") into volume names (e.g. "PPaint_2"). This facilitates the access of files stored on disks (or other media) which are moved from one drive to another. Also, logical names (like "PPaint") are expanded to the full paths (e.g. "Work:Graphics/PPaint") originally assigned to them. This makes it easier for the user to understand the position of each file. The file requester's directory lists can be stored more efficiently if this option is enabled (multiple occurrences of the same list are always recognized).

If the option is disabled, the program never modifies the names which are written in the "Path" string gadget. This may be useful if logical names are used on purpose, for example if the "PPaint" logical name is used to access files in an installation-independent manner. This is necessary if the path name has to be stored in a settings file which could be loaded on a different computer. A full path, like "Work:Graphics/PPaint", may be valid on one system, but could lead to unexpected results on different computer configurations (where Personal Paint may be stored in different drawers). In such cases, logical names must be used. Sections 1.12 ("Environment Variables and Standard Drawers") and 9.1 ("AskAssign") explain how to work with logical names.

8.8.2 Directories on Top

This option determines whether directory names should be placed at the top or at the bottom of the file requester scrolling lists. By default, file names appear at the top, and directory names at the bottom.

8.8.3 Sort by Date

Files may be sorted by name (lexicographic order), or by the last-modification date. The system date and time must always be up-to-date for the latter option to work properly.

8.8.4 Double-Click

When this option is selected, the names displayed in the list box of the file requester can be selected by double-clicking the left mouse button. The requester disappears as if the "Proceed" gadget had been selected. The speed at which the button must be pressed can be set through the Amiga Preferences, as described in the Amiga documentation.

If the option is disabled, the names can still be selected with the mouse, but double-clicks are not interpreted in any special way.

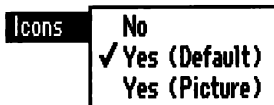
8.8.5 Confirm Overwriting

This parameter affects only the requesters used to define a name for a file to be written by Personal Paint. If this parameter is set, a second requester is displayed if the file already exists and would be overwritten by the operation being executed.

The warning requester contains two gadgets: Proceed and Cancel. If "Cancel" is selected, the function is aborted, and no file is written.

8.9 Icons

When a file is written by Personal Paint, a Workbench icon (section 1.9.7) can automatically be saved with it. An icon is a particular kind of gadget, displayed by the Workbench program, which makes a file immediately recognizable through a graphical image. Icons can be used to select, load, rename, copy or delete the associated file (or drawer, or volume) using the mouse.



A small disadvantage of icons is that they contain graphical data, which requires some - though not a lot of - memory. Personal Paint's default image file icons occupy less than 488 bytes of memory. For the more technically interested users, this means that an icon occupies only one disk sector on any Amiga filing system (a sector in the original non-FFS Amiga filing system can store 488 bytes of data), plus one sector for the directory entry. More than 800 of these icons can fit on a standard 880 kbyte disk.

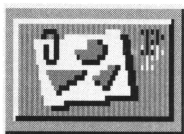
Personal Paint's icons store some additional data in the Default Tool and Tool Types fields. This tells the operating system where to find the program which created the file when its icon is double-clicked, and gives additional information (file format, image size, etc.) which can be edited by selecting the desired icon (one click of the mouse button) and choosing the Information (or Info, on some systems) Workbench menu item. The default information which is stored can be modified by editing the icons in the "PPaint_Icons" drawers.

8.9.1 No

If the disk space is to be highly optimized, or if icons are never used, the No option can be selected to save files without an associated icon.

8.9.2 Yes (Default)

The Default option enables writing of Personal Paint's default icons. Different icon images are used to distinguish between the files saved by the program (pictures, brushes, settings, etc.) These icons are stored in the "PPaint Icons" drawer associated to the current Workbench colors (1.3 or 2.0 colors), where they can be modified with a tool like IconEdit (which can be found on the Amiga Workbench disk).



8.9.3 Yes (Picture)

The Picture option uses default icons except for picture and brush files, where the current image or brush is used to create the icon image. The image is resized, if this is necessary to make it fit into the standard icon width and Workbench display ratio. The current Workbench colors are used to apply a Floyd-Steinberg remapping.



It should be kept in mind that users on different Amiga systems may have different Workbench color settings and display ratios (e.g. interlaced vs. non-interlaced), which may cause icons created on one system to appear differently on another system.

On newer versions of the Amiga operating system, it is possible to specify the number of colors to be used for the Workbench screen. Personal Paint's Picture icons can fully exploit, giving impressive results, up to 256 Workbench colors. There is a potential drawback, however. Only the first four and the last four colors of the Workbench palette are guaranteed by the system to remain constant. The other colors may be changed for particular operating system tasks (like displaying images or setting a new Workbench background pattern). Since this feature would not be completely supported in all possible conditions, Personal Paint uses more than eight Workbench colors only if the <Shift> key is held down while the icon is saved (i.e. just after the end of the Save Image progress indicator).

8.10 Language

Most versions of Personal Paint come with user interface texts in different languages. The Language menu item has one subitem for each available language. With this option, it is possible to select the language used to display all menus, gadgets and program texts.

The default language is normally set in the "Startup_A" file by the disk configuration procedure (section 1.12). Any custom settings in the "Startup_1" or "Startup_2" files would override the default language.

Section 1.14 has more on the user interface files which are loaded when a Language menu item is selected. The current language can be reselected, if the file has been changed since it was last used by Personal Paint. A warning message is displayed if any texts exceed some simple range-checking length limits.

8.11 Tool Bar

As explained in section 3.1, the tool bar can be removed from the screen to view a larger image area. All tools remain accessible through the keyboard shortcuts (Appendix B). Selecting the option again puts the tool bar back.

8.12 Title Bar

The title bar can be removed and redisplayed in a way similar to the tool bar. Menus are accessible by clicking on the right mouse button when the pointer is moved over the topmost screen line.

As explained in more detail in section 3.2, in some overscan video modes the mouse pointer image may not completely reach the region which would normally be covered by the title bar. Even if there apparently is no system pointer feedback, Personal Paint continues to process mouse actions correctly. Personal Paint's brush-shaped pointer remains visible at the correct location.

8.13 Clip Graphics

By default, all graphics operations may extend beyond the visible image limits. For example, flood-filling an entirely blue page with white color would allow the white to fill even those areas which are beyond the screen borders.

If this option is set, the effects of all paint and image processing functions are limited to visible screen areas.

8.14 Backfill Transparency

Sections 5.7.1 and 5.8.5 to 5.8.7 explain how to apply transparency to brush operations. Normally, when a custom brush is defined, all background-colored areas are marked as transparent for future operations.

If the Backfill Transparency option is set, only those background-colored areas which surround the brush are set to be transparent. Parts of the

brush which are surrounded by other colors do not become transparent. This works a bit like "lassoing" the image.

Changing the status of this option does not change the transparency of brushes which were already defined. The transparency plane of the current custom brush can be updated to the new mode by selecting the New Transparency option (section 5.8.5). Other ways of setting transparent areas are described in sections 5.8.6 and 5.8.7.

Brushes which are loaded from a file always inherit their transparency from the associated transparency information (IFF-ILBM format). If the file does not contain any transparency data, the current transparency mode is applied.

8.15 Color Average Resize

All functions which reduce an image down to a smaller dimension are likely to cause a loss of data. The most used functions in this category include resizing of brushes and stretching of images to different formats.

Since the size of the dots which make up the image is device-dependent and cannot be changed, the number of dots is reduced. Halving a brush, for example (section 5.10.4), reduces the number of pixels to about one quarter of the dots in the original brush. Even for a human, it is not easy to decide which dots to "sacrifice".

If this option is enabled, the pixels which are sacrificed are taken into account when creating the destination pixels. A group of two yellow and two red dots, for example, might be reduced to a single orange pixel. On borders between highly contrasting colors, this results in an effect also known as *anti-aliasing*.

Best results can be achieved when several colors whose hue (section 7.1.3.2) is similar to that of the original image can be used in the destination image. For example, a black and white image (or text) can be reduced with excellent results if the destination color palette contains many different shades of gray.

Color average resizing is more complex than plain resizing, and therefore increases demand for processing power or execution time.

8.16 Workbench

Personal Paint allows the user to manually close and reopen the Workbench screen (normally used by the Amiga operating system to display disk icons, Shell and Console windows and any windows opened by other programs).

More than 40 kbytes of RAM are freed when a PAL-size Workbench screen of 256 lines, 640 pixels wide, with four colors (two bit planes) is

closed. Personal Paint automatically tries to close the Workbench screen if the computer has less than 1 Mbyte of Chip RAM.

The Workbench screen is public, i.e. it may be used by other programs. This may be a problem when the Workbench program tries to close its screen, because it must be free of other windows before it can be closed. Windows used to display the contents of storage devices and drawers are closed directly by the Workbench. Other programs (including Amiga system software) which have an open window on the Workbench screen must generally be terminated before the screen can be closed.

If the option is selected when the screen is closed, Personal Paint attempts to reopen the Workbench screen. If there is enough Chip RAM, the screen and its windows are reopened.



9. Other Utilities

Personal Paint comes with different utility programs and data files designed to work in the same environment in which the main program is used. This chapter describes some utilities stored in the "PPaint_Tools" drawer of the program disk.

9.1 AskAssign

As explained in section 1.11 ("Environment Variables and Standard Drawers") it may sometimes be necessary to use the AmigaDOS Assign command to assign logical names. The AskAssign program, which comes with the Personal Paint package, can also be accessed with the mouse from the Workbench environment, rather than the Amiga Shell or CLI. AskAssign is also used by the InstallPPaint procedure.



Section 1.13.1 ("Automatic Installation: The InstallPPaint Program") explains how to create drawers and select the directory (or volume) to which a logical name is to be assigned. When called by InstallPPaint, AskAssign is used to specify the position where the Personal Paint environment is to be installed. If AskAssign is executed as a stand-alone program (by double-clicking its Workbench icon with the mouse), an Amiga logical device name (like "PPaint" or "FONTS") may be assigned. The logical device name can be modified by editing the ASKNAME field in the Tool Types string gadget of the Workbench Information window. To do this, the Workbench Information menu must be selected while the AskAssign icon is highlighted (i.e. after a mouse selection). The texts displayed in the file requester may be modified by editing the other fields which can be displayed in the Tool Types string gadget. By default, the version of AskAssign which comes with Personal Paint is configured to assign the "FONTS" logical device name, if executed from the Workbench.

9.2 ColorText

As explained in section 3.1.3.2, Personal Paint supports text editing using color fonts. Some multi-color fonts are also enclosed with the program. Amiga operating systems starting from version 2.0 support colored fonts

directly. On previous versions, the ColorText utility must be used in order to integrate color font handling capabilities into the system software. ColorText was developed by Inter/Active Softworks, the creators of the original ColorFont format.

On operating systems previous to version 2.0, ColorText can be enabled with a double-click on its workbench icon. Starting from version 2.0, there is no need to use ColorText to use color fonts.

10. Problem Solving

This chapter describes some of the most common problems which may be encountered when using the computer and its peripherals, explaining how to solve these difficulties, and what to do in order to prevent them from the beginning.

10.1 Memory Shortage

Computer memory is one of those few resources which, regardless of the amount which is available, tend to be exploited to the limits. The most common obstacles which may be encountered when using Personal Paint are likely to be connected with insufficient Chip RAM.



Sections 1.3.2 and 4.11 respectively contain important information on RAM in general and on Personal Paint's Memory Information function. As indicated in those sections, the information about memory which is displayed on the Workbench title bar may be misleading, as it sums up fragmented memory as if it were a contiguous block.

A low memory condition may be signalled by an explicit message (e.g. "There is not enough memory", or "Insufficient Chip RAM"), or by symptoms like menus not appearing as usual, windows which cannot be resized or repositioned, screen flashes indicating failures to accomplish a given task, etc.

Chip memory may be made available by:

- Freeing the undo buffer (selecting the Undo tool with the right mouse button - section 3.1.10)
- Clearing the image twice (by clicking twice on the Clear tool - section 3.1.9)
- Choosing a screen mode having less resolution or colors (sections 1.3.2 and 4.5)
- Freeing the current environment (section 4.8.5)
- Freeing brushes (section 5.6)
- Freeing the stencil (section 7.2.7)
- Switching off the audio (section 8.4)
- Closing the Workbench screen (section 8.16)
- Terminating other programs, etc.

Typing "Avail FLUSH" in a Shell window, or selecting FlushLibs in the Workbench Debug menu (which becomes available if the Workbench is activated with a "LoadWB -DEBUG" command) frees all RAM-resident system resources which are not being used any more. This may free some considerable memory if several large fonts were used in previous sessions, or if some complex libraries used by other programs are not needed any more. When the system is in critical memory conditions, it usually performs these actions automatically.

In an emergency (e.g. if the main screen cannot be opened), Personal Paint may automatically and gradually try to free some memory by taking one or more of the actions mentioned above.

10.2 Problems with Disks

The Amiga operating system may perform another disk write operation some seconds after a file is stored. For this reason, a disk should never be ejected from the drive (nor should the computer be switched off) for some seconds after the disk drive activity indicator light has gone off. Electrical noise can also cause problems. Lights, monitors and other electrical devices connected to the same power line as the computer should never be switched on or off while data is being written to the disk.



Errors are first signalled by messages from the Amiga operating system, and then by the program which is trying to save the data. The most frequent sources of errors are: disk is write protected, disk is full, disk is damaged or not formatted (sections 1.3.4 and 1.6). Unlike 5.25" disks, 3.5" disks are write protected if it is possible to see through the write-protect hole.

If, while a file is being written to, the Amiga operating system displays a message indicating that a read/write error has occurred, the first thing to do is to eject the disk and set the write protect tab. Precious data can be lost by trying to write to the disk after such an error message. If the write protect tab is not set, the system may try to write to the disk even if no write operation has been requested by the user (especially if the disk is damaged). After the disk has been reinserted, all the system messages should be cancelled with the mouse (unless a "Software Error" message appears). The program which was saving the data will display its own error message. The data which could not be stored because of the error should be saved to another disk. Any other material which is displayed or stored in RAM should be saved as well, so that it can be recovered if its copy on the damaged disk has been corrupted. Next, a copy of the damaged disk should be made (section 1.6). If the standard system copy program does not work, because of the errors present on the disk, other copiers should be used.

A disk recovery program like DiskSalv will probably be able to restore

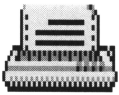
most files, with the likely exception of the one which was being written to when the error occurred. It is possible that different disk recovery programs will produce different results. The disk on which the error occurred should not be used again, unless the cause of the error is known not to be hardware dependent. An error may occur again on the same disk, especially if a single sided or poor quality disk is used, or if the disk is dirty, or the magnetic surface is scratched. Scratches are usually visible when light is reflected from the disk surface. The surface itself should never be touched or contaminated.

Some minor errors are automatically corrected by a process of the Amiga operating system called *validating*. If, for example, a write operation is interrupted for some reason (e.g. a power failure, or the removal of a disk), and no other damage occurs to the disk, the Amiga operating system tries to validate the disk the next time that it is inserted in a drive (or mounted, if it is a hard disk). The validation process can take a few seconds or several minutes, depending on the size of the volume. If the disk is write protected the validating process has to be repeated every time the disk is inserted (or mounted). While the disk is being validated, a "Disk not validated" system message is displayed if a program tries to access that disk. The "Cancel" option of the message should not be selected, as the message disappears automatically as soon as the validating procedure terminates. It is possible to read from a disk which has not been validated, but no data can be saved to it, since the data structures which mark the parts of the disks which are free are not updated.

The most serious errors can be caused by physically damaged or defective disks. The main cause of such errors is dirt. Coffee poured over disks lying on the table, sticky drops of orange soda "raining" from a nearby glass or a few grains of sand inside the disk case can be very dangerous. Unless the magnetic coating of the disk has been scratched or corroded, the data can still be recovered. Most liquids leave the *cookie* (the foil coated with magnetic media inside the disk) intact, but must be removed as soon as possible. The cookie must be taken out of the disk case before it can be cleaned. To do so, a demagnetized blade can be used to carefully open the case. The metal (or plastic) shutter of a 3.5" disk can be removed by hand. The cookie can be washed under running water and dried with a clean, soft cloth. The clean cookie can finally be inserted into a new case (the shutter is not needed), from where it can be copied to a new, intact disk. The procedure described here is not guaranteed to succeed. Improper handling can damage the disk and/or the disk drive.

10.3 Problems with Printers

Some suggestions to improve the quality of the printed output are listed here. Possible solutions to many problems which may occur during a



print operation are also contained in this section.

The parameters of the Amiga Preferences program must be perfectly set. The most common cause of errors is the wrong choice of printer driver. The printer driver specified in Preferences must be the correct driver for the printer which is used. All printer settings of the Preferences program must be correctly set and stored on the Workbench disk. Not all printers use the same codes and control sequences.

If the parallel port is used for a peer-to-peer connection between computers (using a network filing system like "ParNet") then the Printer Port setting in the Amiga Printer Preferences should be set to Serial, or any device other than that used by the network. Use of the Amiga printer device on the same line as the network might lock the network. Programs like Personal Paint might need to access the printer device on startup, even if no explicit printing is performed. Although no data is sent to the printer by this process, this operation may lock the network and the printer device.

When the name of the printer driver has been selected with the Preferences program, the programs which need to use the printer will be able to use the correct printer codes, and Amiga will activate the appropriate printer driver. Personal Paint's printer settings may be used to change most system printer parameters, except selecting the printer driver itself.

By default, printer drivers are stored in the "Printers" drawer, which is contained in the "Devs" drawers of the Workbench and Extras disks. The Amiga operating system searches for printer drivers in the "DEVS:Printers" and "PRINTERS" logical units. A driver stored only on the Extras disk must be copied to the Workbench disk before it can be used. The InstallPrinter program, on 1.3 Workbench disks, allows the user to copy the drivers from the Extras disk to the Workbench disk in a very easy way. On operating systems starting from version 2.1, unused printer drivers are placed in the "Storage/Printers" drawer, from where they can be moved into "Devs" using the mouse when necessary. Some of the most used printer drivers are stored on Personal Paint's program disk. If that disk is used as the Workbench disk, more updated or more specific printer drivers can be copied to it.

If there is no driver for a particular printer model, a similar or compatible driver can be used. Most impact printers are compatible with one or more of the Epson (ESC/P), Nec (Pinwriter) or IBM (Proprinter) standards. Laser printers can generally work in the HP LaserJet and/or PostScript standard. When more than one emulation mode is available, the selection should match the selected Preferences printer driver. The documentation enclosed with the Amiga and with the printer should be read to determine

which is the most suitable driver for a particular printer. Appendix D of this guide also lists several suggested drivers for the most used printers. The printer retailer or manufacturer should be contacted if no information can be found in the handbooks, and the existing drivers do not work. Drivers which were included with versions of the operating system before 1.3, as well as versions labelled Alpha, Beta, Gamma and Omega might not work properly with most software.

The Printer Preferences program can be started with the mouse from Workbench. If the screen has been closed, the Workbench parameter described in section 8.16 can be set to open it again. If the Workbench is still closed, the program should be terminated (section 4.12) to free the memory necessary to open the Workbench screen.

If text characters are printed instead of an image, or undesired characters appear in the text printed by a word processor, the wrong driver was probably selected. As an example, with some inappropriate driver/printer combinations a 'P' or 'K' character (not part of the document) is printed at the beginning of each print operation. The page format (A4, Letter, Wide Tractor, etc.) must also be set correctly in either Personal Paint's or the system's Page/Printer Preferences. Again, it is not necessary to use the system Printer Preferences, if these values are set through Personal Paint.

When a print operation is interrupted (section 4.3), some printers may continue to wait for the remaining image data to be sent. Software reset commands, as well as margin, size and graphical data of subsequent prints could be interpreted as binary data belonging to the first image. This could result in subsequent images being printed at the wrong position, or in the wrong size, or "trash" data being printed. To avoid this, it is sufficient to reset the printer from its control panel (or switch it off and turn it on again, if it lacks a reset function) after interrupting a graphical print.

Sometimes it may be necessary to change the default factory settings of the printer. Some printers have small DIP-switches grouped into banks, located at the rear of the printer or under the cover. Other printers allow the user to change the parameters by accessing the printer memory settings through the control panel. A parameter which is often not set appropriately is the automatic line feed function, which should be disabled to work with most printer drivers. This has to be done if the graphic print is interrupted by wide horizontal lines, or if the line spacing of the text is twice the spacing which was set through the parameters of the word processor. If accents or other particular national characters of a specific language are not printed, and the correct driver was used, it is possible that the character set default setting (e.g. "Italic"/"Epson" versus "Standard"/"IBM") or the language character set should be modified. Personal Paint only prints in graphics mode, but specific text-mode imperfections may indicate more general problems.

If it is possible to choose between tractor (perforated paper) or friction paper feed, it should be noted that friction feed is usually much more accurate over short distances (e.g. single sheets), especially on low-cost printers. On some printers friction feed may not grab a sheet stiffly enough if the paper is too light or too thick (forcing the feed mechanism). A discontinuous, asymmetric and imprecise paper feed may be caused by the wrong paper type.

The presence of thin, light, horizontal lines on the printed output (graphic or text) can be reduced by selecting the friction feed and/or narrowing the printer head to the paper. If the inked ribbon streaks the paper, or dirties the margins of the paper, the printer head is probably too close to the surface of the sheet. On some printers the presence of thin horizontal lines can be reduced by selecting a Custom Paper Size, and/or Single paper type rather than Fanfold in the Preferences program. The internal power supply of some printers is not sufficient to guarantee a homogeneous pressure of all needles on the ribbon. Some drivers may let the printer use only part of their pins (generally the upper 16 of 24) if some parameters in Preferences are set as described above. These drivers make an improper (but surely appreciated) use of some Preferences parameters, which would otherwise remain unused, like Paper Type. The Threshold setting is also sometimes used for different purposes (like adjusting color and lightness correction in the HP DeskJet printer).

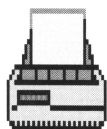
As strange as this may sound, graphics are often printed faster (and with a higher degree of precision) in mono-directional mode than in bi-directional mode. The mode can be selected manually or through software control on most printers. Black and white graphic print is the fastest, while gray level and color printing take longer.

Some settings, like Smoothing, may be activated to reduce diagonal "steps" in the graphic prints. This usually slows down the printing.

On some color printers a black ribbon can (or must) be used to print black text or black and white or gray graphics. In this case, only black ink ribbons, usually more affordable than color ribbons, need be bought.

If the printed colors appear different from what is displayed, it may be useful to apply color, brightness and contrast corrections (section 7.1.4).

A printing density which is too high (e.g. 300 to 360 dpi, rather than 50 to 150 dpi) may cause the printout to be too dark and smeared (especially on ink-jet printers), as well as enhance undesired horizontal stripes.



Similarly, PostScript printouts may become too dark and have very little different shades of gray when the density (LPI) is too high. Section 4.3.3.3 has more on this. In case of doubt, the printer's default values should be used (Personal Paint DPI and LPI set to 0,

Default Spot, angles set to a value greater than 360). The Moiré phenomenon, which causes undesired patterns to appear, is discussed in section 4.3.3.11.2.

Another frequent problem with PostScript printers has to do with the serial connection between the computer and the printer. If the serial port is used, some wires of the cable must be crossed and connected in a different way than other, frequently used, one-to-one connections. To allow for different types of handshaking and interactive operation, the following wiring could be used: 1-1 (input and output pins with the same number are connected directly), 2x3 (pin two is connected with pin three on the other side, and vice versa), 4x5, 7-7, 6+8x20 (pins 6 and 8 on each part are joined, and connected to the opposite pin 20). The other signals are unused. On the software side, it is important that both the printer and the computer use the same Baud Rate (usually 9600 or 19200), Data Bits (e.g. 8), Parity (e.g. Even), Stop Bits (e.g. 1) and Handshaking (e.g. XOn/XOff). These settings can usually be set from the Amiga Serial Preferences and the printer's control panel.

Finally, a warning addressed to the owners of Amiga 1000 models. This computer requires a non-standard parallel printer cable. Connecting the printer cable of another Amiga model, or a standard Centronics cable may damage the equipment.

10.4 Problems with Screen Modes and Video Devices

The main symptom of most of the problems described here are: a black screen, flickering or unstable picture, monitor makes strange sounds and impossible to select certain video modes or colors.

With Amiga operating systems starting from version 2.0, it is possible to specify the monitors which can be used. Each monitor has an associated set of screen (or video) modes. This is important, as different Amiga computers may employ more or less powerful or flexible graphic chip sets and monitor hardware. All display modes which are supported by the hardware and judged to be of good quality should be activated by copying the associated Workbench icon into the "Wbstartup" (version 2.0) or "Devs/Monitors" (version 2.1 and 3.x) system drawers. Otherwise, Personal Paint would not be able to use those modes. Conversely, some video modes could have been inadvertently selected. For example, having activated the "Multiscan" monitor on an Amiga with a monitor capable of displaying only NTSC or PAL pictures may produce unreadable displays when loading some images. If this happens, the monitor files in excess should be moved back from the "Wbstartup" or "Devs/Monitors" directory into "MonitorStore" (Workbench 2.0) or "Storage/Monitors" (versions 2.1 and beyond).



Images created on Advanced Graphics Architecture systems may not look

the same when displayed on earlier Amigas, even if the same amount of colors is used. This is caused by the fact that more color combinations are available for the color palette on AA systems. Personal Paint's palette, color reduction and remapping functions will use the "coarser" color resolution to guarantee a more correct representation of the image if the Original or Advanced Chip Type options are selected in the boot menu of AA systems.

If a display card is used, and the screen does not appear to be updated properly by some graphics operations, or if a system error occurs when a new video mode is selected, the RTG option (section 4.5.5) should be activated.

Double-Scan and other higher bandwidth video modes (as are generated by Flicker Fixer and Display Enhancer devices) require an adequate monitor (MultiSync/multiscan, VGA, etc.) to be displayed properly. The Flicker Fixer or Display Enhancer may have to be disabled when using some of the highest bandwidth video modes. At the opposite end of the range, the original Amiga video modes (e.g. "plain" PAL or NTSC) may have a bandwidth which is narrower than the minimum of some multiscan monitors. This is a particular problem on Advanced Graphics Architecture Amiga systems, where several, completely different, video modes may have to be used (and the lower horizontal scan frequencies are not corrected by a Flicker Fixer or Display Enhancer). Commodore provides special multiscan monitors capable of handling most video modes. Other monitors may work, or may be re-calibrated by a qualified technician to accept lower frequency signals (typically, problems may arise at horizontal scan frequencies below 30 kHz and vertical refresh rates below 55 Hz).

Section 4.1 ("Load Image") has more on video modes.

A. Program Messages

This appendix lists (in alphabetical order) and explains the most important messages of Personal Paint. A more complete description can be found in the referenced sections.

If the message is displayed in a requester containing only the Proceed, Cancel or OK gadgets, the <Return> key can be used instead of the OK or Proceed gadget, while <Esc> can be pressed instead of selecting the Cancel gadget. Sections 1.10.12 ("The <Return> key") and 1.10.16 ("The <Esc> key") have more on the topic.

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This message has to be displayed for strictly legal reasons. More in Appendix E.

Another program is using the file

The operation on the specified file cannot be performed because the file is currently being locked by another process. This can happen, for example, if another program is writing to the same picture file which Personal Paint is trying to load.

Audio cannot be activated

Personal Paint cannot start the CloantoAudio module, after searching for it in the "DEVS" logical volume and in the drawer (or volume) from where Personal Paint was loaded. By default, the "DEVS" logical volume is assigned to the "Devs" drawer of the boot disk (which may be the Workbench disk containing Personal Paint). It may also be that the CloantoAudio file was found, but the CloantoAudio module could not reply in time (handshake function) because it was slowed down by another disk operation, or because there was not enough memory. Personal Paint tries to load the audio module if there is enough memory to do so, and no other Cloanto program has already loaded CloantoAudio. The same CloantoAudio module can serve an unlimited number of Cloanto programs, thus overcoming the limitations set by the Amiga on

the maximum number of open audio channels. If the CloantoAudio module is started manually (e.g. by selecting its icon), it remains RAM-resident until the computer is reset or switched off, and does not need to be loaded every time from its client programs. Sections 1.11 and 1.13.

Bad IFF structure

The file read by Personal Paint is recognized as being in IFF format, but its content does not keep to the rules defined for the IFF standard. Some programs do not use the IFF format correctly.

Brush ... will be lost

This warning message is displayed before Free Brush is executed (section 5.6). If the operation is confirmed, it will not be possible to recover the brush with Restore Brush.

Brush size is ..., ... planes Used size is ..., ... planes

This information is provided by the Chop Information function. More in section 5.12.

Clipboard device cannot be opened

The Amiga public clipboard cannot be opened. The "clipboard.device" file in the "DEVS" logical unit probably cannot be loaded. Personal Paint tries to open the Clipboard (if it is not already open) whenever this is required by a program function. Sections 1.13.4 and 1.15.

Clipboard does not contain the required data

A function which should read data from the clipboard has been used (e.g. brush data), but the clipboard is empty, or only contains a different type of data (for example, digitized audio) than what was expected. Sections 5.9 and 6.1.

Clipboard write error

In most cases, this message indicates that there is not enough memory (RAM or disk) for the Amiga operating system to store the specified clipboard data. Sections 5.9.2 and 10.1.

Data compression algorithm not identified

Graphical data can occupy more memory than one would believe.

Different techniques exist to *compress* this data, so that it occupies less space than it would otherwise. Personal Paint uses and recognizes different standard image compression techniques in the different file formats it uses (IFF-ILBM, GIF, PCX, etc.) Another program may write some data using a compression method (or *algorithm*) not recognized by Personal Paint. When Personal Paint tries to load this data, it displays this message. This means that the data cannot be loaded by Personal Paint unless it is saved in another format.

Decryption impossible

An incorrect encryption key has been used to load an encrypted picture. An encrypted image can only be loaded if the same key used to save the data is also used to load it. This message can also appear if the disk is damaged or the picture file has been modified by another program, though this is very unlikely. Sections 4.1, 4.2 and 8.3.

Disk incompatible

The format of the disk in the specified drive is not recognized by the operating system. The disk may be damaged, not formatted or be in a format not recognized by AmigaDOS. Sections 1.3.4, 4.1 and 10.2.

Disk is not mounted

The specified disk is not inserted in any drive. Section 10.2.

Disk is write-protected

Data cannot be written on a disk which is write-protected. The hole at the corner of the disk must be covered by the write-protect tab. Section 10.2.

Disk not validated

The Amiga operating system has not yet validated the disk. The operation may have failed, or still be in progress, if the disk has just been inserted. If the disk is not successfully validated ("Disk not validated" system message), no new data can be written to the disk, which can be read normally. Section 10.2.

Display Mode Selection

Selected image...

Current mode... - ... colors

The picture selected for a load operation has the same size as the current image format. However, the selected file would require a different video mode from the current one (as indicated in the video mode information

contained in the IFF-ILBM file, or calculated by Personal Paint if there is no such information). This requester allows the user to decide whether to maintain the current screen mode or to adopt the new one. Section 4.1.

Error during file I/O

Personal Paint has several detailed error messages which are used if an error occurs during a read or write operation. The Amiga operating system may issue error codes which Personal Paint cannot translate into messages indicating the exact cause of the error. If this happens during a file read/write operation, this message is displayed.

Error during printer output

An error is signalled by the Amiga operating system while data is being sent to the printer. The most likely causes are: printer is switched off or is in the off-line (deselected) state; printer is out of paper or the paper is jammed; the printer's cover is open; the printer cable is not connected properly; the wrong port (serial vs. parallel) was selected in the Amiga Printer Preferences. Sections 4.3 and 10.3.

Error: The keys are different

Personal Paint requires the encryption key to be written twice. This message is displayed if the first key and the control key are different. This additional control is useful to prevent an image stored using an incorrectly typed key from not being loaded any more. Section 8.3.

File is protected from deletion

File is protected from reading

File is write-protected

The specified file has a software protection which prevents the operating system from removing, reading or modifying it. The Workbench Information (or Info) or the Shell/CLI Protect command can be used to modify the access status of the file.

Format Selection

Requested format...

Current format... - ... colors

Selected image...

Current format... - ... colors

The current image format (i.e. size and/or number of colors) would be changed as specified in the Image Format requester or in an IFF-ILBM or settings file. When an image file is loaded, this requester allows the user

to choose between the new and the current format. The Stretch option can be set to resize the image, if necessary. Color reduction is always applied automatically when needed. Sections 4.1, 4.5, 8.6, 8.7 and 8.15.

Icons cannot be loaded

The "PPaint_Icons" drawer cannot be found, or it does not contain the correct default icon files. Sections 1.14 and 8.9.2.

Insufficient Chip memory for the requested screen Insufficient Chip memory to display window

There is not enough Chip RAM to open a screen, window or requester. Sections 1.3.2 and 10.1.

Invalid data

This general purpose message is used if extremely unusual circumstances are encountered. This may happen, for example, when attempting to load an image whose size is 0 by 0.

Invalid number of colors for the requested screen

In most cases, this indicates that the hardware being used does not support as many colors as specified in the picture or settings file being loaded. Probably, a particular screen mode was requested in an IFF-ILBM file written on a computer supporting the same video mode, but with more colors. Personal Paint automatically selects a different video mode as close as possible to the requested number of colors.

Invalid parameter in line...

An error has been encountered in loading a settings file. One or more parameters of an instruction in the specified line have been found to contain a value out of the valid range. Sections 8.1, 8.2 and Appendix C.

Invalid window size

To contain the required text elements, a window would become larger than the screen. This may happen if requester texts in a "UIText" file are edited without considering space limitations in lower resolution video modes. Sections 1.14 and 8.10.

Line too long...

An error has been encountered in loading a settings file. The line whose position from the top of the file is indicated is too long (i.e. it contains too

many characters). Sections 8.1, 8.2 and Appendix C.

Memory save mode

This message indicates that Personal Paint has detected a low-memory environment and has taken action to reduce the occupation of RAM. This mode can also be activated by holding the <F1> key down while the program is starting. If possible, the program does the following things: the audio functions are not used (the CloantoAudio module is not loaded); the Workbench screen is closed; the printer driver is not pre-loaded at the start of the program, and is removed from RAM (expunged) immediately after each print operation; the directory lists of the file requester are not stored to speed up the re-display of the same lists. Sections 8.16 and 10.1.

No monitor information for the requested screen mode

An IFF-ILBM file contains a reference to a video mode which is not supported by the system hardware or operating system. (Most other file formats do not contain explicit video mode information.) It may happen that a given monitor, theoretically supported by the system, was not activated as indicated in section 10.4.

Object too large

An internal Amiga error has occurred. The data found is too large to be handled by the operating system.

Operation impossible

A function of the Amiga operating system has returned an error, but the cause of the failure is not specified. Personal Paint cannot complete the operation.

Path incorrect

The path (i.e. the set of names of drawers, separated by '/' signs) which is written in the file requester, does not exist in the requested unit. One or more of the drawer names are incorrect or too long (maximum 25 characters). Some characters cannot be used in the names of files and drawers. Sections 1.4, 1.5 and 3.4.

Path too long

The selected path contains too many levels (i.e. drawers within drawers), which AmigaDOS cannot handle.

Personal.font cannot be opened

Personal Paint uses a custom font, which contains symbols especially designed for the program, for its user interface texts. On startup, Personal Paint searches for the font in the "FONTS" logical volume or in "PPaint:Fonts". Section 1.13.

PostScript module cannot be opened

The "PPaint_PS" file cannot be loaded by Personal Paint. The program needs to access this external module to output in PostScript mode. Sections 1.13 and 4.3.3.

Printer device cannot be opened

Personal Paint cannot activate the printer driver to execute a printing operation. This may happen if there is not enough RAM available, or if the "printer.device" file cannot be accessed in the "Printers" drawer in the "DEVS" logical unit. Sections 1.11, 1.13 and 10.3.

Printing copy ... of ...

An image or a brush is being printed. The progress indication gives detailed information on the data which the Amiga printer device has already sent to the printer, and the amount still to be transmitted. Sections 4.3, 5.3 and 10.3.

Stencil size does not match

The operation requested would have required the stencil to be exactly as wide and as tall as the image over which the stencil would have to be applied. Section 7.2 and subsections.

Syntax error in line...

An error has been found in a settings file. In the specified line, a keyword has not been recognized, or a command parameter is missing or appears in an incorrect format. Section 8.2 and Appendix C.

The current font has no palette

The Copy Font Palette command has been executed, but the current font does not have an associated color palette. Sections 3.1.3.2 and 7.1.8.

The current one is the only brush

The Next Transparency command (which copies the transparency information of another brush to the current brush) failed because there is

no other brush. Section 5.8.7.

The file does not contain the required data

A file has been selected for a read operation, but the data contained in that file is not of the expected type, or the content of the file has been damaged. This can happen, for example, if Personal Paint tries to load a settings file, but discovers that the file specified through the file requester contains a brush image. In order to reduce the risk of similar errors, files of different types should not be stored in the same drawer. It is also advisable to append standard *suffixes* to file names. Sections 1.4 and 1.11.

The file does not exist

A file has been specified for a load operation, but Personal Paint cannot find a file with the given name following the specified path. Section 3.4 ("The File Requester") explains how to avoid the risk of mistyping file and directory names.

The file exists and would be overwritten

An operation which would overwrite an existing file has been selected. The Confirm Overwriting option is active (section 8.8.6), so the program displays this warning message, indicating the file whose content would be overwritten. The operation is aborted if the Cancel gadget of the requester containing the message is selected. This makes it possible to execute the operation again, using a different file name.

The file will be deleted

The Delete File command has been executed. The operation is aborted if the Cancel gadget of the requester containing the message is selected. Section 4.10.

The font cannot be opened

The Font Requester has failed to load the specified font. This may happen if an incorrect typeface name is typed, or if the available memory conditions or a read/write error interrupt the font load operation. Section 3.1.3.2.

The image has been modified

The current image has been changed since it was last saved or defined. A command has been executed which would cause the loss of the current image (e.g. a Load Image or Quit command).

The image is too large

The maximum image size supported by Personal Paint is limited by the Amiga hardware. The original Amiga blitter could not handle images larger than 1008 by 1024 pixels. ECS and AA chips can process images as large as 32752 by 32767 pixels.

The image will be cut

An image format smaller than the format of the image currently displayed (or being loaded) has been selected. Unless the Stretch option of the Format Selection requester is enabled, this additional warning requester appears. Sections 4.1 and 4.5.

The other image has been modified

A Copy to Other command has been executed, but the image in the other environment has not yet been saved since it was last modified. Proceeding with the command would cause the other image to be lost. Section 4.8.2.

There is not enough memory**There is not enough memory to load the user interface texts**

There is not enough memory to perform the operation requested. Sections 1.3.2 and 10.1.

The requested screen cannot be used**The requested screen mode requires 2.x O.S. or higher****The requested screen mode requires ECS or higher**

The IFF-ILBM file specified for loading an image also contains a reference to a screen mode to be used. Due to hardware or operating system limitations on the machine used to load the image, another screen mode has to be used by Personal Paint. Sections 4.1 and 10.4.

The screen is not available any more

A screen selected in the Grab Screen requester was closed before it could be grabbed. Section 4.4.

The selected image type cannot be loaded

The selected picture file uses an image encoding format not supported by Personal Paint. These may include unusual IFF formats and image formats which could not be edited with the freedom and precision required by Personal Paint (e.g. Dual-Playfield images).

The size of the following brush does not match

The Next Transparency command cannot apply the transparency information of the following brush to the current one, because the two have different sizes. Section 5.8.7.

The Undo buffer will be freed

An explicit request to release the Undo buffer has been made (e.g. by selecting the Undo tool with the right mouse button), or there is not enough memory to allocate an Undo buffer for the selected operation. If there is not enough memory to display this message, the buffer is freed without displaying this request for confirmation. Sections 3.1.10 and 10.1.

The ... user interface text should be shortened**The ... user interface text should be made splittable**

The "UIText" file for the specified language was loaded successfully, but some texts were found to be too long to be displayed properly in some video modes. A text can be made splittable by inserting an underscore character (‘_’) where Personal Paint may go to a new line if there is not enough horizontal space. Some texts (e.g. non-"TMS" texts) can only be displayed in a single line. If these are too long, they must be shortened. Sections 1.14 and 8.10.

The user interface text file cannot be opened

The "UIText" file associated to the user interface language which is to be loaded cannot be found. Personal Paint searches for the files in the "PPaint_Prefs" drawer of either the "PPaint" volume, or the current drawer. Sections 1.14 and 8.10.

Title not correct

A wrong path has been specified for a file read or write function, or the selected file name is not correct. Sections 1.4, 1.5 and 3.4.

UIText: Error in line...

A syntax error has been found in a "UIText" user interface file. For example, a keyboard shortcut was not enclosed in a couple of ‘<’ and ‘>’ signs, or an unrecognized keyboard qualifier name was used. A line number greater than the number of lines in the file indicates that one or more texts are missing. Sections 1.14 and 8.10.

Volume is full

The unit to which a save operation has been directed is full, and cannot contain the requested amount of data. The data can still be saved on any unit which has enough free room to contain it. The disks which come with Personal Paint are almost completely full. Additional data (e.g. a picture) should not be saved to these disks. Instead, a new disk should be formatted, or a new drawer should be created on a hard disk partition where some space is left, to contain all Personal Paint files. Sections 1.3.4, 1.5, 1.13 and 10.2.

Volume not mounted

The selected peripheral does not contain any storage unit. There probably is no disk in the selected drive. This can only happen if the Expand Path option has been disabled, as Personal Paint's default volume access mode is by logical name, rather than physical name. Section 8.8.1.

Workbench screen cannot be closed

Personal Paint cannot close the Workbench screen, since it contains other windows than those used to display the content of disks and drawers. Section 8.16.

Workbench screen cannot be opened

Personal Paint cannot open the Workbench screen, as requested in a settings file or through a program menu. There is probably not enough free Chip RAM. Sections 8.16 and 10.1.



B. Command Shortcuts

By default, Personal Paint accepts the keyboard command shortcuts which are listed here. Existing shortcuts, or shortcuts to functions not in this list (or empty "<>" fields in the "UIText" files), can be modified, added or removed as explained in section 1.14. Capital (shifted) letters have a different meaning than their lower case equivalent. Keys on the numerical keypad are explicitly marked with a "num" prefix.

Key	Command	Section
<Del>	Show/hide Mouse Pointer	1.10.14
<.>	Round Brush 1	3.1.1
<Num-1..9>	Select Brush 1 to Brush 9	3.1.1
<s>	Dotted Freehand Mode	3.1.2.1
<d>	Continuous Freehand Mode	3.1.2.2
<D>	Filled Freehand Mode	3.1.2.2
<V>	Line Settings	3.1.2.2.1
<F>	Fill Settings	3.1.2.2.2
<q>	Curve Mode	3.1.2.3
<v>	Line Mode	3.1.2.4
<c>	Circle Mode	3.1.2.5
<C>	Filled Circle Mode	3.1.2.5
<r>	Rectangle Mode	3.1.2.6
<R>	Filled Rectangle Mode	3.1.2.6
<e>	Ellipse Mode	3.1.2.7
<E>	Filled Ellipse Mode	3.1.2.7
<w>	Polygon Mode	3.1.2.8
<W>	Filled Polygon Mode	3.1.2.8
<f>	Area Fill Mode	3.1.2.10
<t>	Text Editing Mode	3.1.3
<T>	Font Selection	3.1.3.2
<n>	Image Processing (delimited area)	3.1.4
<N>	Filter Selection	3.1.4.1
<g>	Snap to Grid	3.1.5
<G>	Grid Settings	3.1.5
	Brush Definition Mode	3.1.6
<>>	Zoom in Magnified View	3.1.7

Key	Command	Section
<<>	Zoom out Magnified View	3.1.7
<m>	Magnify Mode On/Off	3.1.8
<K>	Clear Image	3.1.9
<u>	Undo Last Change	3.1.10
<,>	Pick Foreground Color	3.1.11
<[>	Select Preceding Color	3.1.11
<]>	Select Next Color	3.1.11
<Cursor>	Pan View/Stepwise	3.2
<Shift-Curs.>	Pan View/Fine	3.2
<I>	Load Image	4.1
<I>	Save Image	4.2
<P>	Print Image	4.3
<i>	Image Format	4.5
<a>	Image Processing	4.6
<Alt-Tab>	Image/Flip Horizontal	4.7.1
<Shift-Tab>	Image/Flip Vertical	4.7.2
<j>	Switch Environment	4.8.1
<J>	Copy to other Environment	4.8.2
<S>	Show Image	4.9
<?>	Memory Information	4.11
<Q>	Quit	4.12
<F5>	Load Brush	5.1
<F6>	Save Brush	5.2
<A>	Process Brush	5.4
	Restore Brush	5.5
<F1>	Matte Paint Mode	5.7.1
<F2>	Color Paint Mode	5.7.2
<F3>	Replace Paint Mode	5.7.3
<F4>	HBrite Paint Mode	5.7.4
<Alt-r>	Remap Brush Colors	5.8.1
<Alt-t>	New Brush Transparency	5.8.5
<Alt-o>	Flood Brush Transparency	5.8.6
<Alt-v>	Read Brush from Clipboard	5.9.1
<Alt-c>	Write Brush to Clipboard	5.9.2
<Z>	Brush Resize/Stretch	5.10.1
<->	Brush Resize/Smaller	5.10.2
<+>	Brush Resize/Bigger	5.10.3
<h>	Brush Resize/Halve	5.10.4
<H>	Brush Resize/Double	5.10.7
<X>	Brush Resize/Double Horizontal	5.10.8
<Y>	Brush Resize/Double Vertical	5.10.9
<z>	Rotate Brush by 90 Degrees	5.11.2
<x>	Brush Horizontal Flip	5.11.3
<y>	Brush Vertical Flip	5.11.4
<Alt-i>	Brush Chop/Information	5.12.1

Key	Command	Section
<Alt-e>	Brush Chop/Edges	5.12.2
<Alt-l>	Brush Chop/Hidden Parts	5.12.4
<o>	Brush Outline/Simple	5.13.1
<O>	Brush Outline/Trim	5.13.5
<Alt-z>	Brush Handle/Custom	5.14.1
<Alt-u>	Brush Handle/Upper Left	5.14.2
<Alt-s>	Brush Handle/Center	5.14.4
<Amiga-v>	Text/Insert Clipboard	6.1
<Amiga-+>	Text/Next Color	6.2
<Amiga-->	Text/Preceding Color	6.3
<Amiga-c>	Modify Text to End of Line/Color	6.4.1
<Amiga-s>	Modify Text to End of Line/Style	6.4.2
<Amiga-8>	Modify Text to End of Line/Upper Case	6.4.3
<Amiga-2>	Modify Text to End of Line/Lower Case	6.4.4
<Amiga-y>	Modify Text to End of Line/Delete	6.4.5
<Amiga-p>	Text Style/Plain	6.5
<Amiga-b>	Text Style/Bold	6.5
<Amiga-i>	Text Style/Italic	6.5
<Amiga-u>	Text Style/Underlined	6.5
<Amiga-4>	Text Alignment/Left	6.6
<Amiga-5>	Text Alignment/Centered	6.6
<Amiga-6>	Text Alignment/Right	6.6
<Alt-a>	Color Palette/Load	7.1.1
<p>	Color Palette/Edit	7.1.3
<Help>	Color Palette/Default	7.1.5
<*>	Color Palette/Restore	7.1.6
<Alt-b>	Color Palette/From Brush	7.1.7
<Alt-f>	Color Palette/From Font	7.1.8
<~>	Edit Stencil	7.2.3
<'>	Stencil On/Off	7.2.6
<Alt-n>	Remap	7.3
<F7>	Load Settings	8.1
<F8>	Save Settings	8.2
< >	Coordinates/Origin 0:0	8.5
<\>	Coordinates/Origin 1:1	8.5
<F9>	Tool Bar	8.11
<F10>	Screen Bar	8.12
<!>	Clip Graphics	8.13

Key	Command	Section
<Shift>+<Disk Eject>	Personal Paint screen to front	1.10.4
<Shift>+<Mouse Move>	Constrain mouse movement	3.1.2
<L. Alt>+<L. Button>	Emulate middle mouse button	1.9.2
<Ctrl>+<Right Button>	Display Autoscroll screen menus	4.5.4
<Ctrl>+<Mouse Drag>	Modify offset of overscan screen	4.5.1
<Ctrl>+<Left Alt>	Grab Screen "Remote Control"	4.4
<Help>	Edit Palette/Set Default Colors	7.1.3
<Cursor>	Edit Palette/Select Color	7.1.3
<Help>	Adjust Palette/Reset	7.1.4

In a Personal Paint text editing session (section 3.1.3.1), the following keys, which have no menu equivalents, can be used:

Key	Command
<Cursor>	Move cursor by one character or line
<Shift-Cursor>	Move cursor to beginning/end of line or text
<Tab>	Move cursor to following Tab column
<Del>	Delete character at current cursor position
<BS>	Delete preceding character
<Return>	New line
<Esc>	Terminate the text editing session

When editing text in an Amiga string gadget (section 1.9.4.3), the following shortcuts are available:

Key	Command
<Amiga-X>	Delete all text
<Amiga-Q>	Restore original text
<Shift-Cursor>	Move to beginning/end of text
<Return>	Enter value and move to the following text gadget
<Shift-Return>	Enter value and move to the preceding text gadget

When a requester having only the Proceed, Cancel or OK gadgets is displayed, the following shortcuts can be selected (sections 1.10.12 and 1.10.16):

Key	Command
<Return>	Proceed or OK
<Enter>	Same as <Return>
<Esc>	Cancel or OK

C. Program and Environment Settings

Sections 1.14, 8.1 and 8.2 explain how to save program and environment settings to a file. The format and function of the individual settings and their associated file-keywords is described here.

All numbers may be expressed either in decimal or hexadecimal (preceded by a "0x" prefix) notation. For example, "COLORS = 16" is equivalent to "COLORS = 0x10". Each settings file may contain zero or more assignments. In case of duplicate settings (i.e. if the same keyword appears more than once in the same file), the last definition prevails. LONGMIN and LONGMAX respectively indicate the minimum and maximum 32-bit number which is handled (from several billions negative to several billions positive, i.e. 0x7FFFFFFF). Similarly, SHORTMIN = -32768 and SHORTMAX = 32767 (0x7FFF).

C.1 Program Settings

Program settings are global to Personal Paint. Program settings which appear in a settings file which is loaded are applied to all environments.

FILTER (Image Processing Filters - Section 3.1.4)

Format: *FILTER* = "*Name*", *Type*, <*Kernel*>, *DivFac*, *Bias*, *BiasDX*, *BiasDY*

The quoted Name field may contain quote and backslash signs only if these are preceded by a backslash sign ('\\').

Filter Types: 0 = Convolution, 1 = Popularity, 2 = Random, 3 = Dispersed Dithering, 4 = Clustered Dithering, 5 = Floyd-Steinberg Dithering.

Kernel: 5 blocks (rows of the convolution matrix) of 5 values each. Empty fields must be set to 0. The range for each field is SHORTMIN .. SHORTMAX.

DivFac (Division Factor) must be in the range SHORTMIN .. -1 or 1 .. SHORTMAX for Convolution and 1 .. 3 for Dispersed and Clustered Dithering; the value is ignored for the other filter types.

If the Type is Convolution, Bias, BiasDeltaX and BiasDeltaY are also considered, and should be in the range SHORTMIN .. SHORTMAX.

AUDIO (Audio Feedback - Section 8.4)

0 = No, 1 = Yes.

AUDERR (Audio Errors Volume - Section 8.4)

Range: 0 .. 64.

AUDCUE (Audio Cues Volume - Section 8.4)

Range: 0 .. 64.

CREDUC (Color Reduction - Section 8.6)

0 = Qualitative, 1 = Quantitative.

CREMAP (Color remapping - Section 8.7)

0 = Simple, 1 = Pattern Dithering, 2 = Floyd-Steinberg

FILREQ (File Requester Flags - Section 8.8)

Range: 0 .. 31. The individual values must be added: 1 = Expand Path, 2 = Directories on Top, 4 = Sort by Date, 8 = Double-Click and 16 = Confirm Overwriting.

ICONS (Workbench Icons - Section 8.9)

0 = No, 1 = Default Icons, 2 = Picture icons.

LANG (User Interface Language - Section 8.10)

0 = English, 1 = German, 2 = Italian, 99 = Custom.

BARS (Tool and title Bar - Sections 8.11 and 8.12)

Range: 0.. 3 (obtained by adding 1 for Tool Bar activation and 2 for the Title Bar).

GCLIP (Clip Graphics - Section 8.13)

0 = No, 1 = Yes.

BKFTRANSP (Brush Backfill Transparency - Section 8.14)

0 = No, 1 = Yes.

CAVRESIZE (Color Average Resize - Section 8.15)

0 = No, 1 = Yes.

WBENCH (Workbench Screen - Section 8.16)

0 = Closed, 1 = Open.

C.2 Environment Settings

Environment settings are local to the environment from which the settings file is loaded (any program settings appearing in the same file are applied to all environments).

MGFYGRID (Magnify Mode Grid - Section 3.1.8)

Specifies the optional raster type: 0 = None, 1 = Lines, 2 = Dots.

PRINT (General Printer Settings - Section 4.3 and subsections)

Format: *PRINT = NumCopies Mode*

NumCopies may range from 1 to SHORTMAX.

Mode: System Printer = 0, Personal Paint PostScript = 1.

PRINTSYS (System Printer Settings - Section 4.3.2)

Format: *PRINTSYS = Flags Dither Shade TShold Density*

Flags: 1 = Integer Scaling, 2 = Negative, 4 = Smoothing, 8 = Correct Red, 16 = Correct Green, 32 = Correct Blue, 64 = Form Feed.

Dither: 0 = Ordered Dithering, 1 = Halftone Dithering, 2 = Floyd-Steinberg.

Shade: 0 = Black and White, 1 = Gray-1, 2 = Gray-2, 3 = Color

TShold range: 1 .. 15.

Density range: 1 .. 7.

PRINTPS (PostScript settings - Section 4.3.3)

Format: *PRINTPS = Flags Dpi Lpi Spot Output AngC AngM AngY AngK UcrM UcrY UcrK Gcr Process*

Flags is the sum of the following: 1 = Negative, 2 = Mirror, 4 = EPS, 8 = Crops, 16 = Manual Feed, 32 = Compress, 64 = Cyan, 128 = Magenta, 256 = Yellow, 512 = Black.

Dpi: 0 .. SHORTMAX (0 = Device Default)

Lpi: 0 .. LONGMAX (in 1/10000s of Lpi, 0 = Device Default)

Spot: Default = 0, following = same order as Spot cycle gadget, starting from 1.

Output: 0 = System Printer, 1 = Serial Port, 2 = Parallel Port, 3 = File.

AngC, AngM, AngY, AngK range: 0 .. LONGMAX (in degrees/10000, deg > 360 = Device Default)

UcrM, UcrY, UcrK range: LONGMIN .. LONGMAX (in percent/10000 - 0% = No Correction)

GCR range: 0 .. LONGMAX (in percent/10000 - 100% = Black Unchanged)

Process: 0 = gray, 1 = color, 2 = CMY, 3 = CMYK

PRINTLAY (Printer Page Layout - Section 4.3.1)

Format: *PRINTLAY = Flags MsrUnit PaperWidth PaperHeight LeftOffs TopOffs XSizeAuto YSizeAuto XSizePercent YSizePercent XSizeUnits YSizeUnits XSizePixels YSizePixels XSizeTimes YSizeTimes SizeType*

Flags is the sum of: 1 = Center X, 2 = Center Y, 4 = Landscape.

MsrUnit: 0 = Inch, 1 = Centimeter, 2 = PS Points

PaperWidth PaperHeight LeftOffs TopOffs: micrometers, LONGMIN .. LONGMAX.

XSizeAuto, YSizeAuto: must be 0.

XSizePercent, YSizePercent range: 0 .. 100

XSizeUnits, YSizeUnits: micrometers, 0 .. LONGMAX.

XSizePixels, YSizePixels, XSizeTimes, YSizeTimes: 0 .. SHORTMAX

SizeType: 0 = Automatic, 1 = Paper Percent, 2 = Units, 3 = Pixels, 4 = Times.

DISPLAY (Amiga DisplayID - Section 4.5)

This is the ID associated to the screen mode. Programmers may find the relative assignments in "graphics/displayinfo.h" (1.x and 2.x *include* files) or in "graphics/modeid.h" (3.x *includes*).

SCREENW (Screen Width - Section 4.5.2)

Indicates the screen width of the current environment. It must range from 320 (minimum) to the maximum system overscan width. Negative values indicate system overscan widths: -1 = No overscan, -2 = Text, -3 = Standard, -4 = Extreme and -5 = Maximum.

SCREENH (Screen Height - Section 4.5.2)

Must range from 200 to the maximum overscan height. Negative numbers select overscan height values in the same order as in SCREENW.

IMAGEW (Image Width - Section 4.5.2)

This indicates the width of the current image, and may be larger than the screen format. The maximum is defined by the Amiga blitter chip (1008 pixels on original chips, 32752 on ECS and AA chips).

IMAGEH (Image Height - Section 4.5.2)

This is the height of the current image (original blitter limit: 1024; ECS and AA blitter: 32767).

COLORS (Number of Colors - Section 4.5.3)

The number of screen and image colors must be valid for the current DISPLAY setting. On Advanced Graphics Architecture systems, valid values are: 2, 4, 8, 16, 32, 64, 128 and 256.

ASCROLL (Autoscroll - Section 4.5.4)

0 = No, 1 = Yes.

RTG (Retargetable Graphics - Section 4.5.5)

0 = No, 1 = Yes, 2 = Auto.

PALETTE (Palette File - Sections 7.1.1 and 8.1)

The format is: *PALETTE* = "*File Name*"

The quoted File Name field may contain quote and backslash signs preceded by a backslash sign ('\'').

COORD (Coordinates - Section 8.5)

0 = None, 1 = Origin 0:0, 2 = Origin 1:1.



D.

Selection of Amiga Printer Drivers



The following is a partial list of printers and some of the printer drivers which can be used in combination with those printers. Many drivers have been updated several times through the different versions of the Amiga operating system. Section 10.3 has more information on printers.

Manufacturer	Printer	Driver	Note
Alphacom	Alphapro 101	Alphacom_Alphapro_101	
Apple	Imagewriter	ImagewriterII	
Apple	Imagewriter II	ImagewriterII	
Brother	HR 15XL	Brother_HR-15XL	
Brother	xx09/xx18 Series	EpsonX[CBM_MPS-1250]	(2)
Brother	xx24 Series	EpsonQ	(1)
Bull	Compuprint Ser.	EpsonX[CBM_MPS-1250]	(14)
CalComp	ColorMaster	CalComp_ColorMaster or CalComp_ColorMaster2	(10)
Canon	PJ-1080A	Canon PJ-1080A	
Canon	Bubble Jet Series	CanonBJ10 or CanonBJC	(13) (12)
CBM	MPS 1000	CBM_MPS1000	
CBM	MPS 1224	Nec_Pinwriter	(3)
CBM	MPS 1250	EpsonX[CBM_MPS-1250]	
CBM	MPS 1500 C	EpsonX[CBM_MPS-1250] or CBM_MPS1000	(9) (8)
CBM	6400	Diablo_630	(7)
CIE	CI-3500	CBM_MPS1000	(8)
CIE	Lips 10	EpsonX[CBM_MPS-1250]	(9)
Citizen	MSP Series	EpsonX[CBM_MPS-1250]	(2)
Citizen	Premier 35	Diablo_630	
Citizen	Swift Series	EpsonQ or Nec_Pinwriter	(1) (15)
Comrex	CR II and III	Brother_HR-15XL	
Diablo	630	Diablo_630	
Diablo	Advantage D25	Diablo_Advantage_D25	

Manufacturer	Printer	Driver	Note
Diablo	C-150	Diablo_C-150	
Dynax		Brother_HR-15XL	
Epson	LQ Series	EpsonQ	(1)
Epson	DX-20	Diablo_630	
Epson	xX Series	EpsonX[CBM_MPS-1250]	(2)
Facit	x50 Series	EpsonX[CBM_MPS-1250]	(9)
Facit	x80/x90 Series	EpsonQ	(1)
Fujitsu	DL Series	FujitsuDL	(12)
Fujitsu	Breeze Series	HP_DeskJet	(13)
Gemini	10X	EpsonXOld	
Hewlett-Packard	DeskJet (B&W)	HP_DeskJetOld	
Hewlett-Packard	DeskJet (Color)	HP_DeskJet	(13)
Hewlett-Packard	LaserJet	HP_LaserJet	
Hewlett-Packard	PaintJet	HP_PaintJet	
Hewlett-Packard	ThinkJet	HP_ThinkJet	
Howtek	Pixelmaster	Howtek_Pixelmaster	
IBM	Proprinter	CBM_MPS1000	
Juki	5510	EpsonX[CBM_MPS-1250]	(2)
Juki	6000	Diablo_630	
Juki	6100	Diablo_630	
Juki	6300	Diablo_630	
Mannesmann Tally	MT Series	EpsonQ	(1)
NEC	CP2 and CP3	EpsonX[CBM_MPS-1250]	(2)
NEC	Pinwriter Series	Nec_Pinwriter	(3)
Okidata	ML/Microline Ser.	EpsonQ	(1)
Okidata	192 and 193	CBM_MPS1000	(8)
Okidata	92	Okidata_92	
Okidata	292 and 293	Okidata_293I	(4)
Okidata	Okimate 20	Okimate_20	
Panasonic	KX-P 3131/3151	Diablo_630	
Panasonic	KX-P xx23/xx24	EpsonQ	(1)
Panasonic	1080/91/92, 1592	EpsonX[CBM_MPS-1250]	(2)
Philips	PP 40x Series	EpsonQ	(1)
PostScript	All Devices	PPaint_PS	(16)
Quadram	QuadJet	Quadram_QuadJet	
Qume	LetterPro 20	Qume_LetterPro_20	
Qume	Sprint2	Diablo_630	
Samsung	SP-24xx Series	EpsonQ	(1)
Seiko	5301, 5303, 5312	Seiko_5300	(11)
Seikosha	BP,SBP,SP,SL532	EpsonX[CBM_MPS-1250]	(2)
Seikosha	SL/LT Series	EpsonQ	(1)
Star	NL, NX, ND, NR	EpsonXOld or	(9)
		CBM_MPS1000	(8)
Star	LC-10, FR-10	EpsonX[CBM_MPS-1250]	(2)
Star	x24 Series	EpsonQ	(1)

Manufacturer	Printer	Driver	Note
TEC	F10	Diablo_630	
Tektronix	4696	Tektronix_4696	(12)
Tektronix	4693D	Tektronix_4693D	(12)
Toshiba	P351 C, 341, 1340	Toshiba_P351C	(5)
Toshiba	P351 SX	Toshiba_P351SX	(6)
Toshiba	P321 SL/SLC	Toshiba_P351SX	(6)
Toshiba	P341 SL/SLC	Toshiba_P351SX	(6)
Triumph Adler	TA MPR Series	EpsonQ	(1)
Xerox	4020	Xerox_4020	

Notes:

- (1) For Epson 24/48-pin printers and compatibles (360 by 360 dpi graphics). Compatible printers must be set in the Epson LQ or ESC/P2 emulation mode. Also works well in text mode on 8/9-pin printers.
- (2) For Epson 8/9-pin printers and compatibles. Compatible printers must be set in the Epson X emulation mode. Better results in both text and graphics mode may be obtained using the EpsonXOld driver. The EpsonQ driver should be used for 24-pin printers.
- (3) For NEC Pinwriter 24-pin printers and compatibles. Compatible printers must be set in the NEC Pinwriter emulation mode.
- (4) The IBM interface module is required.
- (5) Drives all Toshiba P351 C and compatibles.
- (6) Drives all Toshiba P351 SX and compatibles.
- (7) The Centronics option is required.
- (8) The printer must be in IBM mode to use the CBM_MPS1000 driver. Some functions may not be activated.
- (9) To use the EpsonX driver, the printer must be in Epson mode. Some features may not be supported. Note (2) also applies.
- (10) The CalComp_ColorMaster driver should be used on systems with less than 1 Mbyte of RAM. The CalComp_ColorMaster2 driver is faster, but uses more memory. Both drivers also work with the CalComp ColorView printer.
- (11) The Seiko_5300a driver is also available. The Seiko_5300a is faster than the standard Seiko_5300, but it requires more memory. Note (12) also applies.
- (12) These drivers are not included on the Workbench and Extras disks. They may be available from the printer manufacturer, in Amiga disk

collections (e.g. Fish Disk) and electronic bulletin board systems (e.g. BIX).

- (13) New drivers introduced with version 2.1 of the Amiga operating system.
- (14) Tests have shown that 9-pin Epson drivers may yield better printouts than IBM and EpsonQ drivers even on 24-pin printers. Note 9 may also apply.
- (15) The improved *Print Manager* Amiga drivers are available from Citizen. Note 3 also applies.
- (16) The PostScript driver is activated directly in Personal Paint (regardless of the Amiga printer driver) by selecting the PS Mode in the first print requester (section 4.3).

E.

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Index

3-D (brush outline), **104**

A2024 monitor, 29, 77, 87, 114

AA, *see* Advanced Graphics

Architecture

Accents, **17, 18**

Action gadget, **12**

AddMem, **4**

Adjust color palette, 21, 70, 73,
115-116

Advanced Graphics Architecture
(AGA), 11, 35, 40, 85-87, 95,
114, 145-146, 167

AGA, *see* Advanced Graphics
Architecture

Airbrush, **51-52**

Alignment (text), **109**

Alt keys, **18-19**

AmigaDOS Replacement Programs
(ARP), 27, 33

Amiga

keys, **19**

Preferences, 16-17, 20, 72-75, 81,
87, 131, 142-145, 150

ANSI SGR control sequences, 107

Anti-aliasing, 39, 134

Area settings, 37-38, 48, **49-50**

ARP, *see* AmigaDOS Replacement
Programs

ASCROLL, **167**

AskAssign, 22, 28, 130, **137**

Aspect ratio, 55, 75, 100

Assign, 22-23, 64, 130, 137

AUDCUE, **164**

AUDERR, **164**

AUDIO, **164**

Audio, 2, 26, **126-127**, 139, 147-148,
152

Automatic centering (page layout),
74

Automatic installation, **27-29**

Autoscroll, **88**

Avail, 3, 140

Backfill transparency, 60, 98,
133-134

Background and foreground colors
image, **119**
brush, **97**

Backspace key, **20-21**

Backup, **6-7, 8, 33-34**

BARS, **164**

Baseline, 53

Bézier, 50

Bias (convolution), 57-58

Bigger (brush), **100**

Bitmapped fonts, 53

BKFTTRANSP, **165**

Blitter, 3, 85, 88, 155

Blur, 39, 56-57

Brush

colors, **96-98**

custom, **46-47**

default, **46-47**

definition, **59-60**

handle, **104-105**

menu, **93-105**

outline, **103**

BS key, *see* Backspace key

- Cache RAM, 3
- Caps Lock key, **19**
- CAVRESIZE, **165**
- Check box, **12**
- Chip RAM, 2-4, 24-25, 72, 91, 139
- Chop (brush), 94, **102**
- Circle (tool), **50-51**
- Clear (tool), 36, 38, **61-62**, 139
- Clipboard, 53, **98-99**, 107, 148
 - empty clipboard, **99**
 - read brush, **99**
 - write brush, **99**
- Clip graphics, 51-52, 61, 88, **133**
- CloantoAudio, 26, 127, 147-148, 152
- Clustered dots dithering, 58, 95
- CMY and CMYK color separation,
 see Color separation
- Color
 - average resize, 35, 43, 99, **134**
 - correction, 73, **77-78**, **82-83**,
 115-116
 - fonts, 53-55, 116, 137-138
 - in Brush menu, **96-98**
 - menu, **111-122**
 - merge, **41-43**, 120
 - models (RGB vs. HSB), 113
 - reduction, **40-41**, 70-71, 87, 89,
 120-121, **127-128**, 146
 - remapping, 35, **40-41**, 43, 89,
 119-121, **128-129**, 132, 146
 - resolution, 113-114, 145-146
 - selection tools, **62-63**
 - separation, 80-81, **82**, 84, 165-166
 - text, **107-108**
- COLORS, 167**
- ColorText, **137-138**
- Command shortcuts, *see* Shortcuts
- Commodore (left Amiga) key, **19**
- Complement brush colors, **97**
- Compression (PostScript), **81**
- Configuration
 - memory, 1-2
 - microprocessor, 3
 - graphics, *see* Advanced Graphics
 Architecture, Enhanced Chip
 Set, Retargetable Graphics
- Configuring Personal Paint, **23-25**,
 29-31
- Confirm overwriting, **131**
- Continuous freehand (tool), **48**
- Convolution, 57-58
- COORD, **167**
- Coordinates, 63-64, **127**
- Copy colors
 - from brush, **116**
 - from font, **116**
 - from image (to brush), **98**
 - from screen, **116**
 - in requester, **114**
- Copyrights, *see* Legal notes
- cRAM, 4
- Create range (color palette), **115**
- CREDUC, **164**
- CREMAP, **164**
- Crop marks (PostScript), **81**
- C source code, 71-72
- Ctrl key, **19**
- Cursor keys, **20**
- Curve (tool), **50-51**
- Custom
 - brush, **46-47**
 - chips, 2-3, 91, 113, 154
- Cycle gadget, **12**
- Dead keys, 15
- Default
 - brush, **46-47**
 - palette, **116**
- Define brush (tool), **59-60**
- Delete
 - file, **90**
 - text, **108**
- Del key, **21**
- Density
 - PostScript, 79
 - system printer, **77**
- Depth arrangement (screen), 9, 11
- Deutsch, 16
- Digitized images, 56, 71, 115, 119,
 126, 128

- Direct Memory Access (DMA), 3
- Directories on top, **130**
- Disks, 4-5
 - Backup, **6-7**
 - MS-DOS, 71, 81
 - Problems, **140-141**
- DiskSalv, 140
- Dispersed dots dithering, 58, 95
- DISPLAY, **166**
- Display
 - cards, 85, 88, 146, *see also*
 - Advanced Graphics
 - Architecture, Configuration, Retargetable Graphics
 - Database, 10, 40, 85-86
 - Enhancer, 86, 146
 - ratio, 55, 69, 75, 95, 100, 132
- Dithering
 - filters, 58, 95
 - in color remapping, 97, 119-120, 129
 - pattern, 49
 - printing, **75-76**, 77
- Division factor (convolution), 57-58
- DMA, *see* Direct Memory Access
- Documentation, **1**, 33-34
- Dots per Inch (DPI), **79**
- Dotted freehand (tool), **47-48**
- Double brush, **100**
 - horizontal, **101**
 - vertical, **101**
- Double-click, **131**
- Double-scan, 86, 146
- DPI, *see* Dots per Inch
- Drawer, **5-6**
- DrawImage() function, 72
- Driver, *see* Printer driver
- ECS, *see* Enhanced Chip Set
- Edge detect, 56
- Edges (brush), **102**
- Edit
 - filter, **57-58**
 - palette, **112-113**
 - stencil, **118**
- EGA, 72
- EHB, *see* Extra Half Brite
- Ellipse (tool), **51**
- Empty clipboard, **99**
- Encapsulated PostScript (EPS), **81**
- Encrypted images, 71-72
- Encryption key, 70-72, **125-126**, 149-150
- English, 16
- Enhanced Chip Set (ECS), 85, 87, 113-114, 155, 167
- Environment, 29-30, 40-42, 85, **89-90**, 123-125, 155
 - copy to other, **89**
 - free current, **90**
 - merge in back, **89-90**
 - merge in front, **89**
 - settings, **165-167**, *see also* Settings
 - switch, **89**
- EPS, *see* Encapsulated PostScript
- Error, *see also* Problems
 - codes, 24-25
 - diffusion, 57-58, 71, 97, 120, 129
 - messages, **147-157**
 - system, **9**
- Esc key, **21**
- Expand path, 66, **130**, 157
- Exploring Personal Paint, **34-35**
- External user interface files, **29-31**, 156
- Extra Half Brite (EHB), 40, 85, **96**, 113, 115, 121
- FastFonts (FF), 26
- Fast RAM, 3, 91
- FF, *see* FastFonts
- File
 - names, **5**, 64-66, 72, 130
 - requester, 26-28, **64-67**, 71,
- File requester (*continued*), **130-131**, 137, 152
- Fill, 35-37, 49-50, **52**, 98, 133
- FILREQ, **164**
- FILTER, **163-164**

- Filters, 39, **56-58**, 95
 - editing, **57-58**
 - selection, **56-57**
- FixFonts, 55, 90
- Flicker Fixer, 86, 145-146
- Flip
 - brush, 38, **101-102**
 - image, **88-89**
- Flood transparency (brush), **98**
- Floyd-Steinberg, 35, 41, 43, 57-58, 71, 76, 119-120, 129, 132, 146
- Font, 17, 26, 28, 52-56, 90, 109, 116, 137-138, 140, 153-154
- Font requester, 52, **53-56**, 154
- Format selection, 69-70, 150-151, 155
- Form feed (printer), **78**
- Fragmentation (memory), 4
- Free
 - brush, **95**
 - environment, 62, **90**
 - stencil, **119**
- Freehand (painting tools), 36-38, 47-48, 56, 59
- Friction feed, 144
- Function keys, **22**
- Gadget, **11-13**
 - action, **12**
 - check box, **12**
 - cycle, **12**
 - scroll, **12**
 - slider, **12**
 - text, **12-13**
- GCLIP, **164**
- GCR, *see* Gray Component Replacement
- GIF, II, 5, 35, 43, 69, 71, 95
- Grab
 - palette, **116**
 - screen, **84-85**
- Gradient
 - fill, 35-38, 49-50, 63
 - in image processing, 57-58
- Graphical keys, **17**
- Graphics boards, *see* Display cards
- Graphics Interchange Format (GIF), *see* GIF
- Gray Component Replacement (GCR), 83
- Grid
 - magnify, 61-63
 - snap to, 59
- Guru, *see* Error
- Halve brush, **100**
- Handle (brush), 59, 93-94, 98, 104-105
- HBrite, *see* Extra Half Brite
- Help key, **21**, 112, 116
- Hidden (brush), **103**
- Hide requester (palette), **115**
- Histogram, 121-122
- Horizontal flip (brush), **89**
- IconEdit, 99, 132
- ICONS, **164**
- Icons, 5, **13**, 26, 90, 97-98, **131-132**, 151
- IFF-ILBM, 30, 43, 69-71, 94, 97, 104, 112, 117, 134, 148-152, 155
- ILBM, *see* IFF-ILBM
- Image
 - aspect (PostScript), **79**
 - aspect (system printer), **76**
 - format, **85-86**
 - palette, 98
 - processing, **38-40**, **56**, 57-58, 71, **88**, **95**, 124-125, 133
 - size (in page layout), **74-75**
 - size (screen vs. image), **87**
- IMAGEH, **167**
- IMAGEW, **167**
- Info (brush), **102**
- Insert clipboard (text), **107**
- Installation, **25-29**, 33, 137
 - automatic, **27-29**
 - manual, **26**

InstallPPaint, *see* Installation
Interleaved bitmap, *see* IFF-ILBM
Invert stencil, **118-119**
Italiano, 16

Jet count (airbrush), 52

Kernel (convolution), 57-58

Key

- Accent, 17
- Alt, **18-19**
- Amiga, 19
- Backspace, **20-21**
- Caps Lock, 19
- Commodore (left Amiga), **19**
- Ctrl, **19**
- Cursor, **20**
- Del, **21**
- Esc, **21**
- Function, **22**
- Graphical, 17
- Help, 21
- Numerical, **21**
- Return, **20**
- Shift, **17-18**
- Tab, **20**

Keyboard, **15, 18**

Keyboard shortcuts, *see* Shortcuts

Landscape orientation (page layout), **75**

LANG, **164**

Language, 16, 23, 29-30, **132-133**, 156

Legal notes, I-II, 147, 173-174

Less colors, **120-121**, *see also* Color reduction

Line

- pattern, **38**
- settings, 38, **48-49**, 50

Lines per Inch (LPI), **79-80**

Load

- brush, **93-94**
- image, **69-71**
- palette, **112**
- settings, **123-124**
- stencil, **117**

Loading Personal Paint, **23-25**, 29-31

LoadRGB32() and LoadRGB4() functions, 72

Lower case (text), **108**

LPI, *see* Lines per Inch

Magnify, **60-61**, 63

Manual, *see* Documentation

Manual

- feed (printer), **81**
- installation, *see* Installation
- margins (page layout), **74**

Measuring, *see* Unit

Memory, 1-4, *see also* Cache RAM, Chip RAM, Fast RAM

- Chip vs. Fast, 3, 91
- fragmentation, 4
- information, **90-92**
- save mode, 22, 152
- shortage, 86, 92, 139-140

Menus, **13-15**

Merge colors, **120**

Messages, **147-157**, *see also* Error
MGFYGRID, **165**

Micrometers, 74

Middle mouse button, 11, 19, 63

Modify to end of line (text), **108**

Moiré effect, 80, **83-84**

Mouse, **11**

Mouse pointer, **11**

Moving around, **63**

MS-DOS, 5, 71, 81

Multicolored lines, 48

Multiscan monitors, 145-146

New transparency (brush), **97-98**

Next color (text), **107-108**

Next transparency (brush), **98**

Number of colors, **87**, *see also* Color reduction

Numerical keypad, **21**

Outline

- brush, **103**, 104
- text, 56

Output (PostScript), 80-81

Overscan, 63, **86-87**, 88, 133

Overwrite warning, 67, 112, **131**, 154

Page layout, 74**Painting tools, 47-62**

Paint mode, 47-48, 63, **95-96**

- color, **96**
- HBrite, **96**
- matte, **96**
- replace, **96**

PALETTE, 167**Palette**

- adjust, **115-116**
- apply to brush, **98**
- copy from brush, **116**
- copy from font, **116**
- copy from screen, **116**
- edit, **111-115**
- in tool bar, 62-63

Parameters, *see* Settings

ParNet, 142

PCX, 5, 69, 71-72, 149

Peripheral units, **4-5**

Personal.font, 26, 153

Picking a color (palette), **113**

Pixel, *see* Unit

Planes (brush), **102-103**

Pointer, *see* Mouse pointer

Polygon (tool), **51**

Popularity filter, 58

PostScript, 26, 72-74, **78-84**, 144-145, 153

PostScript point, 74

PPaint.man, 1, 33

PPaint_PS, 26, 153

Preceding color (text), **108**

Predefined brushes, 36, 38, 42, 46-47

Preferences, *see* Amiga Preferences

PRINT, 165**Print**

- brush, **94-95**
- image, **72-84**

Printer driver, 2, 72-73, 75, 77, 81, 142-143, 152-153, **169-172**

Printer's buffer, 73

PRINTLAY, **166**

PRINTPS, **165-166**

PRINTSYS, **165**

Problems, **139-146**, *see also* Error, Installation (manual), Memory, Virus programs

memory, **139-140**

disks, **140-141**

printers, **141-145**

screen modes and video devices, **145-146**

Process (PostScript), **81-82**

Process, *see* Image processing

Program

memory, **92**

messages, **147-157**

settings, **163-165**, *see also* Settings

Progress indicator, 40, **67**, 132, 153

Project menu, **69-92**

Qualitative reduction, *see* Color reduction

Quantitative reduction, *see* Color reduction

Quit, **92**

RAM, *see* Memory

Random Access Memory (RAM), *see* Memory

Randomize filter, 56, 58

Rectangle (tool), 36, 38-39, **51**, 97

Registration marks, 81

Remap

- brush, **96-97**
- image, **119**

Requester, **11**

- Resize brush, **99-100**
- Restore, *see also* Undo
 - brush, **95**
 - image palette, **116**
- Retargetable Graphics (RTG), **88**, **146**
- Return key, **20**
- RGB and HSB color models, **113-114**
- Rotation (brush), **101**, **102**
- RTG, *see* Retargetable Graphics
- RTG (environment setting), **167**
- Sample text (in font requester), **54**
- Save
 - brush, **94**
 - image, **71-72**
 - palette, **112**
 - settings, **124-125**
 - stencil, **117**
- Scaled fonts, **54-55**
- Scaling (printer), **76**
- Screen, **10-11**, **45-67**
 - format, **85-86**
 - modes, **10**, **55**, **69-70**, **85-88**, **93-95**, **112**, **145-146**
 - size, **87**
- SCREENH, **167**
- SCREENW, **167**
- Scroll gadget, **12**
- Serial port, **80-81**, **142**, **145**, **150**
- SetMap, **16**, **23**
- Settings, **123-125**
 - environment, **165-167**
 - initial, **25**
 - program, **163-165**
- Shade (printer), **77**
- Shadow (brush outline), **103**
- Sharpen, **57**
- Shear (brush), **102**
- Sheet feeder, **78**
- Shift keys, **17-18**
- Shortcuts, **13-15**, **17-22**, **29-31**, **103**, **108**, **133**, **156**, **159-162**
- Show image, **90**
- Simple outline (brush), **103**
- Slider, **12**
- Smaller (brush), **100**
- Smoothing (printer), **77**
- Snap to grid, **59**
- Software error, *see* Error
- Sort by date (file requester), **130**
- Sort colors (palette), **114**
- Spot (PostScript), **80**, **144-145**
- Square (brush outline), **103**
- Standard drawers, **22-23**
- Startup files, **25-26**, **29-30**, **116**, **123**, **125**, **133**
- Statistics, **121-122**
- Stencil, **38-40**, **63-64**, **70-71**, **92**, **117-119**, **153**
- Straight line (tool), **50**
- Stretch
 - brush, **46**, **100**, **102**, **134**
 - font, **55**
 - image, **70**, **87**, **89**, **134**, **150-151**
- Style
 - font, **54-55**, **107-109**
 - text, **108-109**
- Suffixes, **5**, **29**, **154**
- Swap colors
 - brush, **97**
 - image, **119**
 - palette, **114**
- System
 - error, *see* Error
 - memory, **91-92**
 - printer, **75**
- Tab key, **20**
- Text
 - editing, **17-21**, **31**, **38-40**, **52-53**, **54**, **107-109**, **137**
 - gadget, **12-13**
 - menu, **107-109**
- Threshold (printer), **77**
- Title bar, **14**, **63-64**, **88-90**, **96**, **133**
- Title (of a project), **5**
- Tool bar, **45-46**, **47-48**, **90**, **133**
- Tools, **47-62**

Trademarks, *see* Legal notes

Transparency (brush), 56, 94-98,
102, 117, 133-134, 153, 156

Trash printing, 143

Trim (brush outline), **104**

Tutorial, **33-43**

UCR, *see* Undercolor Removal

UIColors, 25-26, 29, 94, 112

UIText, 26, 29-30, 151, 156, 159

Undercolor Removal (UCR), **82-83**

Undo, 46, 49, 52, 56, **62**, 115, 139,
156, *see also* Restore

Units

graphical, 75

memory, **2**

printer, **74, 79-80**

Unused

bitplanes, 72, 102-103

colors, *see* Color reduction

Update stencil, **118**

Upper case (text), **108**

User interface, **10**

User interface files, **29-31**, 156

Utilities, **137-138**

Validating (disk), 141, 149

Vector fonts, 53-55

Vertical flip (brush), **89**

VGA, 29, 72, 87, 146

Video devices, **145-146**

Virus programs, **7-9**

WBENCH, **165**

Window, **10-11**

Workbench screen, 9, 19, 132,
134-135, 139, 152, 157

Zoom (tool), **60**

User Guide Supplement

Since the publication of the original User Guide, Personal Paint has gone through major improvements. We thank all users of Cloanto products for their support and feedback.

This supplement describes new program features. Sections are ordered as they appear in the original manual and in the software menus (a '<' sign is used to mark section numbers which have been inserted between existing sections).

New features of Personal Paint include:

- *Animation (featuring a storyboard, superior compression, multiple palettes, frame-by-frame timing, ANIM-5/7/8 and hybrid formats, etc.)*
- *Sophisticated "behind the scenes" memory management, including virtual memory (swaps inactive image data to Fast RAM and disk storage) and multiple levels of undo and redo*
- *New, faster image processing effects, including transparencies, alpha channel and single image stereograms (both SIRDS and custom pattern stereograms, as in "Magic Eye")*
- *Support of Retargetable Graphics (display cards like the Picasso, Retina, Piccolo, Rainbow, EGS, Talon, Cybergraphics etc.)*
- *Animation on RTG display cards (with or without double-buffering)*
- *Direct, high quality 24-bit printing (Color and Black & White) and interface to third-party software such as Studio Print Server*
- *Professional and fast modes for converting 24-bit pictures (IFF, PNG, PCX, PBM etc.) to 256 colors or less*
- *HAM, HAM8, Picasso and Cybergraphics 24-bit viewer active during color reduction*
- *First paint program worldwide to support the new PNG (Portable Network Graphics) file format*
- *External input/output modules (loaders and savers) for easy extensions and upgrades. Modules for IFF, PNG, PCX, PBM, Amiga DataTypes and several others are included. A GIF module is available from public domain sources.*
- *Support and editing of IFF, PNG and GIF project annotations (Author, Copyright and Comment fields, plus Amiga filenotes)*
- *Autoscroll painting*
- *Workbench Application Icon (Drag and Drop)*
- *ASL-compatible file requester*
- *More power through machine language code: the software is in part up to 500% faster*
- *"New Look" user interface*
- *A collection of utilities, including color fonts, new DeskJet printer drivers (up to four inks) and JPEG DataType*

1.2 System Configuration

On systems having only one Mbyte of total RAM, newer versions of the Amiga operating system (e.g. version 3) and certain custom software and hardware configurations (e.g. permanently resident utilities or multiple floppy disk drives) occupy more memory than the original system configuration, and may leave insufficient free memory to run Personal Paint. If this is the case, an attempt should be made to install Personal Paint to hard disk or floppy disk with the "decompress" option of the installation procedure enabled (section 1.13.1). The decompressed version of the software uses more disk space, but requires less RAM during loading. In general, 1 Mbyte systems benefit more by an inexpensive RAM expansion than by an upgrade to a newer and more memory consuming operating system.

1.3.5 Virtual Memory

The term "Virtual memory" is associated with the ability to address a storage space much larger than the RAM normally available on the computer. Personal Paint can use both Fast RAM and/or disk space to store image data which would normally occupy a more "precious" type of RAM (e.g. Chip RAM). Provided that enough Fast RAM and/or disk space are available, Personal Paint can temporarily move all unused items to a secondary storage location. The main items which may be moved are: images, animations, brushes, transparency and stencil planes, storyboard, environment and brush undo buffers. Personal Paint only moves an object to virtual memory if it is not "active", that is, the item must not be currently displayed or processed. Enough Chip memory must still be available for the current screen, the current image (or animation frame) and the current brush. Functions such as Color Merge may temporarily need to access more objects.

The Memory Information requester (section 4.11) indicates the amount of virtual memory currently in use and allows the user to manually move data to virtual memory.

The Settings menu gives access to the Memory Management requester (section 8.<3>), which allows the user to switch RAM and/or disk based virtual memory on or off.

1.9.4 Gadgets

Underlined characters indicate keyboard shortcuts to gadgets. Additional new features are described in section 1.14 (External User Interface Files) and appendix B (Command Shortcuts).

1.10.4 The <Shift> Keys

Section 8.9.3 describes how to use the <Shift> key to create Workbench icons in up to 256 colors. Section <6.8 explains how to use <Shift> to apply a single color palette when color-reducing an animation. If <Shift> is held down while an animation file is dragged and dropped over the Personal Paint application icon, the file will be only played, and not loaded.

1.12 Configuring and Loading Personal Paint

The program disk is no longer bootable. Wide diffusion of different, new versions of the Amiga operating system on different machines made it impractical to use Workbench 1.3 as a common denominator to boot on all systems. Optional additional disks may still be used to store picture and animation files. The install routine can copy these to the hard disk as requested.

Personal Paint fully supports Amiga Application Icons (*drag and drop*). This means that whenever the program is loaded on a system running at least version 2.0 of the operating system, a small "PPaint" icon (AppIcon) appears on the Workbench (the text under the icon also indicates the name of Personal Paint's ARexx port). The program automatically loads any image and animation files dragged and dropped over the application icon. If

<Shift> is held down while an animation is dropped over the icon, the animation is only played - not loaded. A simple double-click on the icon brings Personal Paint to the front of all screens.

The "PPaint:PPaint_Icons" drawer contains additional icon description files, which can be modified by the user: "def_AppIcon", "def_Drawer", and "def_Animation".

While "PPaint:PPaint_Prefs" remains the default location for storing settings files, during startup Personal Paint also scans the "ENV:PPaint" drawer (if it exists). Any files stored in "ENV:PPaint" have a higher priority than those in "PPaint:PPaint_Prefs".

The use of Amiga environment variables is especially useful when it is not possible to write to the application storage medium, for example if Personal Paint is run from a CD-ROM. To make these changes persist after the computer is reset, they must be stored in "ENVARC:PPaint".

1.13.1 Automatic Installation: The InstallPPaint Program

The Amiga Installer program is used to install the software. Context-sensitive help is available on-line by pressing the <Help> key.

1.14 External User Interface Files

All user interface pictures (tools, gadget images, etc.) are stored in a separate and editable file named "UIGraphics.pic" (inside "PPaint_Prefs").

The file may be stored in PNG format to reduce disk occupation. For faster program loading after hard disk installation, it can be loaded as a brush and saved again using the IFF-ILBM format.

The user interface text files (UIText.xxx) contain a version number, used to identify the release version of the text file. This number is read by Personal Paint, and should normally not be changed by the user.

The underscore character can be used in sections TXW (window texts) and TXG (gadget texts) of the user interface text files. The character following the underscore will be underlined and used as a keyboard shortcut, in accordance with the Amiga user interface specifications.

Supported gadget types are: cycle gadgets, checkboxes, sliders, listviews (scrollboxes) and action gadget texts (e.g. "_OK").

When input by the user, lower case letters are treated differently than capitals in cycle gadgets, proportional gadgets and listviews. The former force the gadget to "go forward", while the latter make it "go back". In other gadget types, upper and lower case letters are treated as identical.

Due to the new Animation features, more menus have to share the same horizontal screen space. The underscore character can be used to indicate where a menu title text can be abbreviated (this may be necessary when using low-resolution screen modes). For example, the program could abbreviate "Anim_ation" to "Anim.", should this be necessary. Otherwise, the menu would be displayed normally ("Animation").

2.7 Personal Paint for Authors

Personal Paint offers a unique range of features designed for authors of artwork to be distributed on computer files. In this section, we would like to share with you some of the experience collected by leading artists. We also explain some of the settings we at Cloanto prefer in our own configurations.

An image or an animation created with public distribution in mind requires some

considerations which are normally not relevant when a file is used only on the author's computer.

As the public grows wider, compatibility becomes an issue: the image or the animation may have been created using a screen mode different than what a viewer may have available. Some (especially older) picture and animation players had limitations and bugs, and it could be interesting to have access to a range of options designed to prevent potential difficulties before they become a problem for end users.

Associating information such as author, copyright, and other comments to files is usually appreciated both by authors and by the public (as well as by possible publishers). Also, there should be no difficulties or formalities in distributing the icons created by the art application, or even replacing these with new default icons. Both the icons and the image file should be product-neutral (no hidden advertising texts inside the file). After more than six major versions, Personal Paint offers experienced answers to these and many more requirements.

Most computing platforms use display modes made of square pixels (i.e. an X/Y ratio of 1, as on the Macintosh, or on the PC's VGA) as a standard. This means that the pixels are exactly as tall as they are wide. To be round, a circle drawn on such a screen would be as wide (in pixels) as it is tall. Not so on the Amiga. The original non-interlaced Amiga modes had a ratio close to 0.5 (so-called "tall-pixels"). A "round" circle could be 10 pixels on the X-axis and 5 pixels on the Y-axis. Most artists prefer to work with square pixels. Yet even here there is no exact match on the Amiga. PAL and NTSC screen modes, for example, have pixels of slightly different ratios. Before it draws a circle, Personal Paint queries the Amiga Display Database to obtain information on the ratio. For example, the Display Database could tell Personal Paint that a "round" circle must be 10 pixels wide and... 9 pixels tall. This is not what most artists want. Rather than working with similar approximations, at Cloanto we prefer to activate the Square Pixels option (section 8.<13.4). This ensures that the resulting images appear correctly when viewed using 1:1 pixels, regardless of the screen mode in which the image was created.

Normally, when storing an image in formats such as IFF-ILBM, information about the current screen mode is also saved. When the Amiga was first released, associating a screen mode to an image allowed simple viewer applications to quickly open a screen of the same type as the one used by the author. At that time, options were limited: screens could be either low resolution or high resolution, interlaced or non-interlaced. These were common to all Amigas. Minor difficulties would result from images crossing the oceans separating PAL from NTSC video modes. Today, there are not only different generations of Amiga display hardware, but even third-party graphics boards. Even users of identical Amiga computers may have installed different Monitor files on their systems (section 10.4). Furthermore, applications became more intelligent: Personal Paint, for example, excels in automatically picking the best available screen mode to display an image.

Over the years, associating default screen modes to pictures has become more dangerous (the default may not be available, or viewable, on the user's machine) and less necessary (software is more intelligent). At Cloanto, we now prefer to store all images without associating a default screen mode to the file. To switch this option, open the Options window in the Save Image requester (section 4.2) and clear the Screen Format setting. File formats which cannot save screen mode information (e.g. PBM) do not have this option.

Animations require some additional attention. In accordance with the different Amiga ANIM specifications (standards for animation file formats), a default screen mode *must* be specified in the file. Personal Paint and the most used Amiga animation players are capable of overriding this information when loading an animation, and can automatically select an appropriate screen mode just as Personal Paint does for images. This is necessary, for example, when an animation's default mode is not supported on the computer where the animation is to be played. Nevertheless, when an animation is *saved*,

the current screen mode is always stored with the animation. At Cloanto, we have decided to associate "DblPAL" screen modes to the animations we create and distribute. These screen modes are supported by all AGA machines, and can be displayed on VGA monitors not supporting 15 kHz modes. Furthermore, the pixel X/Y ratio of PAL is closer than NTSC to 1, which is preferred by most artists. The AGA chip-set is very common among the more active Amiga users. Yet even if the end user's machine does not support DblPAL, the animation can be displayed in other screen modes (the screen mode information is only a hint required by the ANIM standard, not an imperative for applications).

Users of original and ECS Amiga chip-sets, as well as users of some display cards such as the Picasso II should consider another issue: color resolution. AGA allows users and applications to define and set colors using 8 bits per color component (red, green and blue). This is 24 bits (or 256 gray-levels, or more than 16 million different color-combinations). Older Amigas only support 4 bits per component (i.e. 16 gray-levels, or 4096 colors). The Picasso II uses 6 bits per component (64 gray levels, or 262 144 colors). This means that on some systems colors cannot be defined with the precision possible on AGA (e.g. on the Amiga 1200 and 4000), for example. Users of Personal Paint can quickly check the color resolution of their system by displaying the Palette requester (section 7.1.3) and setting any color-slider to the maximum. The numerical value indicates the precision of the system (e.g. a maximum level of 15, 63 or 255 would indicate that the system supports 16, 64 or 256 levels for that color component).

When a palette is loaded on a system with a lower color resolution, a majority of colors is likely to "snap" to coarser levels. If the image is then saved again, a loss of data may occur. As an artist, you may want to make sure that the colors you see on your system will be loaded and represented the same way by an older Amiga. Or, even if you do not own a system capable of handling 8 bits per color component, you may need to edit images in that resolution without losing precision. Personal Paint offers a solution to all these requirements, by allowing the user to manually set the color precision (number of bits per color component). Even if this is different (higher or lower) than what is supported by the system, Personal Paint can use a custom value for all processing, overriding the Amiga defaults. As explained in section C.3, when the program settings REDBITS, GREENBITS and BLUEBITS are set to 0, Personal Paint uses the maximum color resolution supported by the video device currently used. This is the program's default. Other values, however, force Personal Paint to use specific numbers of bits per color component. For example, setting all three values to 8 allows for precise editing of AGA-resolution palettes even on ECS or Picasso II systems.

At Cloanto, where we work with different Amiga computers and graphic boards, we manually set REDBITS, GREENBITS and BLUEBITS to 8 in our own startup files. If you have an AGA computer and you only work in AGA screen modes, you should not need to set these values yourself (by default this is taken care of by Personal Paint), unless you want to emulate a coarser color resolution.

When we save an image, at Cloanto we use the IFF-ILBM format if the image is mainly for Amiga distribution. The options we normally set are: compression active, no screen format information. IFF-ILBM is the most supported Amiga image file format, and also offers excellent loading and saving times (e.g. viewers are faster), but its compression is not as good as in other formats (i.e. the files are longer). When space is really tight and excellent compression is a priority, we use PNG (options: compression level 9, no progressive display, automatic mode enabled). Setting a PNG compression level higher than 6 slightly improves compression, but considerably slows down the compression procedure. PNG is also our format of choice when the images are to be read by other computers. We used to prefer GIF for cross-platform distribution, but GIF's popularity was suffocated at the end of 1994, after Unisys Corporation began demanding royalties for software reading and writing GIF (and TIFF/LZW) files. When we write images to be used on an Amiga CD-ROM, we sometimes prefer another format: uncompressed

IFF-ILBM (no compression, no screen format information). This can generate quite long files, but on a CD-ROM space is usually not a problem. Due to the minimum software overhead, uncompressed IFF-ILBM files can be loaded considerably faster than other formats, especially on slower machines.

When we write animations, at Cloanto we usually store them in ANIM-5 format. This is the most supported standard for Amiga animation files. It also offers good compression. ANIM-7 files can be processed faster, although they are not compressed as well and are not as widely supported as ANIM-5. We use ANIM-7 for 256-color animations, and sometimes to store all types of animations on CD-ROM, when we know that an ANIM-7 viewer is available (e.g. Personal Paint). Very rarely, when a disk is really packed, we store animations in the ANIM-5+7 format. When this format is used, Personal Paint decides whether to use ANIM-5 or ANIM-7 on a frame-by-frame basis, depending on which format yields the best compression. This adheres to the ANIM specifications, but requires that the software loading the animation can handle both ANIM-5 and ANIM-7. We never use ANIM-8. It is neither as popular nor (in general) as good as ANIM-7.

Quite often, at Cloanto we use Personal Paint to optimize old animations (use of the Optimize Frames command is explained in section <6.3) before saving them again. This alone can halve the size of certain animation files. Some older and not very popular animation viewers do not support frame-by-frame timing. In this case, the Optimize Frames command cannot be used. These same programs usually also do not support more than one color palette per animation (introduction to chapter 6). Personal Paint marks these palettes with three dots under the associated frame in the storyboard (section <6.4). At Cloanto, we use frame-by-frame timing and multiple palettes without concerns, since neither of the limitations described here is an issue with the most recent and the most used Amiga animation viewers.

A few other options can affect the animation format. Before the animation is saved, we make sure that the current screen mode is the one that we want to associate to the animation (see explanation in this same section).

Some older programs have a bug which does not allow them to handle certain types of properly-written ANIM files. DPaint (up to release V) is one of these programs. When compatibility with these applications is important, we disable the Full ANIM Optimization option (section <6.2).

As an author or publisher of an image or animation, you may want to fill-in the Author, Copyright and Annotation texts, which are supported by most file formats (section 4.10.1). You could put your name as the Author, and something like "Copyright © [Year of first publication] [Your name] - Freely Distributable" in the Copyright text. The Annotation could include a postal or E-mail address. Personal Paint allows for this information to be easily edited at any time. Empty fields are not saved, and do not occupy any space in the file.

On the Amiga, Workbench icons are usually associated to files. Personal Paints can save images and animations using the default icons stored in the "PPaint:PPaint_Icons" drawer. These icons also determine the Default Tool, which is the program which will be loaded when the file is double-clicked on. If you like the icons which come with Personal Paint (they are freely distributable), you can leave them as they are, or perhaps you may want to change the default tool, for example by putting "VT" instead of "PPaint:PPView". This can be set with the Workbench Information command. PPView is a short program which uses Personal Paint as a viewer (it loads Personal Paint, if it is not already loaded). Please be careful not to Snapshot (Workbench command) the icons inside "PPaint:PPaint_Icons" to a fixed position. When dropping a new default icon inside the drawer, select the Workbench UnSnapshot command.

At Cloanto, we usually set the Icons option to Original (section 8.9.4) when we only want to change the file format of a picture or animation. This guarantees that the existing icon

image will not be affected.

3.1.2 The Painting Tools

While a mouse button is held down (e.g. to define a brush), cursor keys can be used to scroll the image, and Magnify Mode can be switched on and off using the keyboard shortcut (default = <m>). In animation mode, it is possible to switch to the previous or next frame while a painting tool is in use.

3.1.3.2 The Font Requester

A second scrollable list contains the different sizes and attributes available for the currently highlighted font. The sample text can be dragged and scrolled with the left or middle mouse button.

Like in the file requester, the mouse can be dragged over the list box (which is automatically scrolled) to highlight one item after the other.

A cycle gadget allows the user to quickly switch among three different font paths: "FONTS:", "PPaint:fonts" and a user-defined custom path.

3.1.4.3 Transparency Effects

Personal Paint has two image processing effects which can be used to achieve different levels of transparency when copying one object over the other: Environment Transparency and Brush Transparency. Brush Transparency includes a special alpha channel mode.

In all cases, the current image is always the one which is modified by the effect (i.e. it is the target image). Environment Transparency uses the other environment as the source, while Brush Transparency uses the current brush (and the following brush, in alpha channel mode). Brush Transparency feels more intuitive after toggling the Image Processing tool on the toolbar to the third position (brush mode, section 3.1.4). Using the mouse, the brush can then be "pasted" over the image, with a variable degree of transparency. If the brush image processing mode is combined with the Environment Transparency, it is possible to create a "Rub Through" effect, as if a brush-shaped hole perforated the current image, making it possible to look into the other environment. This is one of the predefined effects, and is great for progressively bringing up details in animations.

Since transparency effects tend to create a lot of new colors, it is recommended to activate the "F-S Error Diffusion" option in the Filter Selection requester. Like all other effects, the predefined filters can be modified, and new filters can be defined. The Kernel and DivFactor parameters of the filter are ignored, while Bias is used to adjust the degree of transparency of the source image (-1 = alpha channel mode, 0 = complete transparency, 255 = no transparency). The Rub Through effect has Bias set to 255 (i.e. the source image is copied over the destination image "as is"). The Bias DX and DY values specify the horizontal and vertical transparency transition, as described for other filters (e.g. Light-Dark Oblique Gradient).

The alpha channel is a special feature which is only available with Brush Transparency effects. The alpha channel mode is activated by setting the Bias value to -1, and requires two consecutive brushes rather than one. In this mode, the degree of transparency of each pixel in the brush is a function of the brightness of the corresponding pixels in the second brush, rather than being defined by the plain Bias value. The additional transparency information provided by the second brush is called *alpha channel*. This data is very useful, for example, to create and manipulate images which must remain antialiased regardless of the background. White pixels in the second brush correspond to complete opacity, while black and undefined pixels indicate full transparency.

3.1.4.4 Alpha Channel

The alpha channel is a special feature which is available with Brush Transparency effects. The alpha channel mode is activated by setting the Bias value to -1, and requires two consecutive brushes rather than one. In this mode, the degree of transparency of each pixel in the brush is a function of the brightness of the corresponding pixels in the second brush, rather than being defined by the plain Bias value. The additional transparency information provided by the second brush is called *alpha channel*. This data is very useful, for example, to create and manipulate images which must remain antialiased regardless of the background. White pixels in the second brush correspond to complete opacity, while black and undefined pixels indicate full transparency.

Example. Suppose you want to paste down a brush which is solid in the center and gradually becomes more transparent towards the edges. The alpha channel brush would reflect this and can be created using a gradient fill, white in the center fading to black around the edges.

3.1.4.5 Stereograms

What is a single image stereogram? It is a single picture containing different information for the left and right eye. When the eyes look at the picture "normally", the hidden clues cannot be recognized. However, when each eye looks at a different spot on the picture (which is what happens when the eyes pretend to look at an object positioned before or beyond the picture), after some adjusting, matching patterns can be recognized. Acting on eye convergence and divergence, the differences in the pattern provide the brain with depth information.

3.1.4.5.1 How to Create a Stereogram

To generate a stereogram, you need to use both program environments: one to provide depth information and one to render the actual stereogram. Stereogram animations are also possible. If you select the Pattern stereogram type (SIPS) instead of the Random Dot type (SIRDS), you need to store a tile-pattern in the current brush.

In single image stereograms, the "hidden image" is defined by different levels of depth. The 3D image does not have its own colors: it consists of depth information only. It does however inherit the texture of the "container" image, where very creative combinations of colors and patterns can be used. In the pattern type of stereograms, for example, a pattern can be used to create a forest or a sea, where the 3D shapes can be concealed.

Depth information is provided by shapes drawn in different levels of gray. Simple shapes are normally easier and quicker to recognize. If text needs to be written in the hidden image, sans-serif, extra bold type is usually more readable. Black indicates the "most elevated" (closest) level, white corresponds to the "deepest" (farthest) level, while "flatness" is associated to a 50% gray (in the Palette requester: H=0, S=0, V=50%). This is the level which is not distorted when using pattern stereograms. Note that "front" and "back" are subjective, and can be reversed depending on the technique used for viewing the image: cross-eyed or parallel style.

Extreme depths, such as those associated to black and white, are not necessarily the easiest to recognize. To the contrary. Highest quality is usually provided by intensities closer to medium levels of gray.

For a quick test, draw a black box on a 50% gray background. Then go to the other environment, choose an appropriate screen mode (having the same size as the screen containing the black box) and color palette, select Image Processing from the Project menu and select one of the Stereogram filters. SIRDS (Random Dot Single Image Stereograms) are constructed using random dots, whereas SIPS (Single Image Pattern Stereograms) use the current brush to create a pattern. Personal Paint will render the

stereogram in the current environment. Different variants of predefined filters are provided: High Quality filters produce stereograms which are easier to recognize, whereas the More Levels filters are capable of rendering more detailed depth variations (up to 256 levels, associated to gray shades ranging from white to black).

The pattern used for SIPS stereograms should be as "fractal" as possible. Smooth color transitions and wide areas of the same color should be avoided. The more color-information per unit of length, the stronger the illusion will be. Since the patterns are slightly distorted to render the stereogram, patterns which are naturally irregular (such as leaves, waves, grass, marble, etc.) tend to be more suitable than other (more geometrical) shapes. Of course it is possible to retouch the resulting stereogram, or paste it into another picture, to create something like a beach with a shark hidden underwater.

Help symbols can be placed automatically on stereograms. By default, these are constructed by drawing small squares on top of the image, but they can easily be replaced by pasting a custom brush over the square. For convenience and maximum accuracy, the squares have an odd pixel size, so that in Magnify mode the brush handle can quickly be positioned over the central pixel of the box.

Technically, stereograms are created by constructing vertical columns of almost identical patterns. When the eyes are crossed or widened as required to view single image stereograms, each eye focuses on a different column. The difference between the repeated patterns is very similar to the difference perceived by the eyes when looking at an object in the real world. What makes stereograms particularly interesting from a scientific point of view is that perspective information is not required at all. In fact, people who normally rely on perspective rather than on eye convergence to calculate distances have more difficulties than others when viewing stereograms.

The wider the pattern (i.e., the columns), the greater the perceived distance. Too narrow or too wide patterns should however be avoided, since the resulting stereograms are not easy to view (the eyes must be able to cross or widen enough, so that two consecutive patterns overlap).

The width of the pattern is determined either by the brush width (SIPS stereograms) or by other filter settings (section C.1). In case of SIPS, the current environment should have the same color palette as the brush. For stereograms about as large as a VGA computer screen, 8 columns should provide a good quality/contrast compromise. This means that for SIPS stereograms the brush width would be 1/8th of the screen width, in pixels. Of course a brush can contain a pattern which is already repeated two or more times in the brush itself.

The stereogram cannot render any information in the far left and right of the image. This is because there can be no overlapping of patterns when one eye approaches the left or right edge, since the other eye would look outside the image.

The complexity, and most of the compromises of computer generated stereogram generation are caused by the fact that each column forms a pair with both the column to its left and the one to its right. When all this information is overlapped, shadows and echo effects may appear. Personal Paint's filter settings (section C.1) provide different options to finely tune the creation process. For example, where "ghost" outlines result from very sharp changes in elevation (more likely to occur in SIPS than in SIRDS), flattening the image, increasing the Quality value or activating the Echo Suppression option should help. Echo Suppression works by using random stripes of the pattern as necessary. As a side effect, the hidden shapes may emerge in the final image.

For very small stereograms (e.g. thumbnail format), a High Quality SIRDS style with high contrast image colors (e.g. black and white) could be the best choice, if ease of recognition is a priority.

For stereo-animations, SIRDS are usually preferred to SIPS, because large patterns

changing position from frame to frame would disturb the viewer. Section C.1 explains how to change the random seed for SIRDS, or automatically use a new seed for each stereogram. One may think that a constant animation background (as could be provided by using positive BiasDx values) would help recognition of animated stereograms. In most cases, practice has proven the opposite to be true: if the random seed does not change from one frame to the other (and thus the pattern remains constant), the brain becomes able to concentrate on the "tricks" employed to render the stereogram. So it is better to use negative values (i.e. "noisy" background). In any case, creating an animation using a positive random seed value remains an interesting experiment.

3.1.4.5.2 Viewing Stereograms

Important: Single image stereograms have recently become very popular through posters and best-selling books (e.g. "Magic Eye", "Stereogram" and "3D Wonderland" series). Personal Paint uses some of the most recent and effective stereogram generation techniques, although the first papers dealing with this subject have been published more than 30 years ago. Since stereograms were first used for scientific visualization and in medical tests, research has been conducted on potential side effects of humans viewing such images. Not only have no harmful effects been discovered, but the techniques used for viewing single image stereograms are also sometimes employed for eye training. While even reading a textbook may cause eye strain and mental fatigue, we believe that it remains prudent to consider that crossing eyes, merging two different views into one and separating focusing from convergence are all actions which do not occur frequently in a natural environment. People with ametropia (e.g. hypermetropia or astigmatism) may tire more easily when viewing these images. Also, some optometrists have advised that people with autonomic ataxia and those at the beginning of farsightedness caused by age should avoid attempting naked eyed 3D viewing.

While other methods use polarized light or colored glasses to separate the images, single image stereograms can be seen by focusing on a point which is either between the eyes and the picture (cross-eyed style), or much farther away than the picture (parallel style). Some stereograms can be seen in one of the two styles only.

Most stereograms have two reference symbols on top of the picture, to ease proper adjusting. When you stare at the page out of focus, the two symbols may appear as four. This is because the eyes do not converge on the same image, and thus see "double". Now slowly adjust your eyes until the two inner symbols overlap, so that you see a total of three symbols. This is the appropriate convergence to see the stereogram. Slowly move your eyes downwards. You should soon begin to recognize some shapes, which your eyes will be able to focus on. The process can be initiated, for example, either by bringing a finger close to your eyes and moving it, or by imagining to concentrate on something very distant (e.g. mountains or clouds), or by putting the picture to the nose, and then slowly moving it forward, leaving the eyes unfocussed. It is very important that the page be perfectly flat and horizontal. All edges should have about the same distance from your face. Try and resist the temptation to focus on the monitor (or paper). Once the brain begins to merge the two images, focusing will slowly follow automatically.

Some people experience more difficulties than others when seeing a stereogram for the first time. Here is what William C. Haga had to say on the Internet: "Being one who has used wide-eyed vision on chain link fences ever since I was a kid, I was able to see the images right away. But I've had difficulty explaining the technique to friends. Today I had the latest Games magazine with me at my parents' house. Games is running another contest using SIRDS, so there are three in the latest issue. This time I thought of the reflection idea. So I opened mom's china cabinet, put the magazine against the glass in the door, and told mom to keep looking at her own reflection in the glass until the image appeared. It took less than thirty seconds. When she saw the 3D train engines, I was subjected to a squeal of delight that I hadn't heard from her for a long time..."

3.1.9 Clear

When the Clear tool is selected with the right mouse button, the Clear Frames requester appears. This allows the user to clear (without removing) one or more Animation frames.

3.1.10 Undo

The Undo tool allows the user to move backwards and forwards through the history of changes applied to the image and to its color palette.

Clicking on Undo with the right mouse button performs a "redo". The maximum number of changes which can be undone (undo levels) is limited only by the available RAM and hard disk space, and can be finely tuned in the Memory Management requester (sections 1.3.5, 8.3.2 and C.1).

The use of Personal Paint's multi-level undo feature is not limited to experimenting and correcting mistakes. For example, it may sometimes be useful to go back a few levels only to copy a piece of an older image with the Brush tool, and then paste the brush on the current image. Copying an area with a brush does not affect the chain of undo levels.

The undo buffer can be freed either by pressing <Ctrl-u>, or by clicking on the dedicated gadget in the Memory Information requester (section 4.11), or by selecting the Clear tool twice. This is an extremely useful way of making some memory available in critical conditions.

The Brush and Color Palette menus have Restore functions which provide for additional undo capabilities (sections 5.5 and 7.1.6).

3.2 Moving Around

The image can be scrolled to the end of the page by holding down the <Alt> key while the cursor keys are used.

3.4 The File Requester

The mouse can be dragged over the list box (which is automatically scrolled) to highlight different items. Only the last item is selected.

One unified list, associated to a single gadget (or to a click on the right mouse button), includes both logical and physical device and assigned names. The list ends with a pre-selection of the full paths whose contents is already loaded by other file requesters in the same program. For example, if a brush needs to be loaded from the same path already used to load an image, from the "Load Brush" file requester it will be sufficient to click on the right mouse button and click again on the appropriate entry at the end of the list box.

The Delete gadget can be used to delete files and (empty) directories. A new directory can be created by extending the Path string (e.g. by editing "Pictures:" into "Pictures:Space"). "def_Drawer" is installed in "PPaint:PPaint_Icons" in order to allow the program to associate a Workbench icon to the drawers which are created.

All file requester paths can be saved as default paths in the program settings files. These configuration options are explained in detail in appendix C.

4.1 Load Image

Recognition of previously supported file formats has been improved. State of the art color quantization and reduction algorithms have been employed to load 24-bit images and transform them into images having 256 or less colors. The quality of the resulting 256-color images is not easily distinguishable from a 24-bit display. The selected Dithering option (section 8.7) is taken into account by the new 24-bit procedures (Floyd-Steinberg gives best quality, whereas Pattern Dithering combines good quality

with high speed).

HAM and HAM8 are processed by the program as 24-bit images (just as 24/48-bit PNG, IFF24 and PCX24). Personal Paint also uses the Data Type loaders supported from version 3.0 of the Amiga operating system.

Personal Paint excels in handling HAM, HAM8 and 24-bit images and transforming them into color-indexed pictures (up to 256 colors). During this high quality conversion process, the program can display the original HAM or 24-bit image in a second screen (HAM, HAM8, Picasso, Cybergraphics, etc.). The two processes take advantage of Amiga multitasking: one program continues working on the image, while the other allows the user to view the original image.

When a 24-bit image is loaded, the program presents a requester indicating the format of that image. The top gadget, which is selected by default, tells the program to use the screen size of the new image. If the "Preview" option of that requester is selected, a second screen will open (in HAM or 24-bit mode). While the second screen is displayed, Personal Paint continues color quantization and dithering in the background. The first screen always contains the usual progress requesters indicating the status of the conversion.

The preview screen and the main screen can be swapped by pressing the <Space> bar or by clicking the right mouse button. Pressing <Esc>, or clicking on the left mouse button while the HAM screen is displayed closes the preview screen.

The more professional settings (sections 8.6 and 8.7) may be slower when viewing and/or color-reducing HAM, HAM8 and 24-bit images, while Pattern Dithering limited to 16 colors is considerably faster.

In animation mode, if the image format differs from the frame format of the current animation, a requester appears to allow the user to decide whether to resize the image or the animation. Load Image normally loads the picture into the current animation frame. If animation is no longer desired, Free Animation must be selected before loading the picture.

4.3 Print Image

In addition to the system printer and PostScript modes, Personal Paint incorporates 24-bit printing routines, as well as an interface to the Studio Print Server software. This allows users of the Studio and CanonStudio packages (version 2 and beyond) to print directly from Personal Paint.

If the Mode cycle gadget is set to Studio, Personal Paint adds each print job to the Studio print spool, and does not need to wait for the printing process to complete. The image data is stored in a temporary file, from where it is printed by Studio. Personal Paint's temporary files are stored in the device having more free space, choosing from those specified in the Virtual Memory settings (section 8.<3.1).

Personal Paint's Studio server (message port) name is "PPaint_Studio". This name may be requested by the Studio software (e.g. to save a configuration).

4.3.2.1 Dithering

Custom dithering routines have been written using the latest software technologies in order to yield maximum quality in 24-bit printing.

Ordered dithering is the default, and gives good print quality at a reasonable speed (dispersed 16x16 matrix - more technical information in section 3.1.4.2). Halftone dithering (clustered 7x7 matrix) may be suitable for pictures containing mostly saturated colors. Floyd-Steinberg gives best results, but takes longer to compute.

4.3.2.4 Shade

Personal Paint now features 24-bit printing (16 million colors), which overcomes the traditional limitation of 4096 colors and 16 gray shades of the Amiga printer device. (Personal Paint's PostScript mode has always been 24-bit.) The new modes are activated by the "24-bit Color" and "8-bit Gray" settings in the Shade cycle gadget.

24-bit printing uses special dithering routines to create color shades from a limited set of primary printer colors (more in section 4.3.2.1). A few printers work in "true color", and do not require the program to create dithering patterns. For example, the Fargo Primera dye-sublimation color printer comes with its own 24-bit driver. In such a case, normal system printing can be used.

Even in 24-bit printing, it is still necessary to have the appropriate Amiga printer driver selected through the Amiga Preferences (unless Personal Paint is operating in its own PostScript mode).

Further adjustments to improve print quality can be made in the Gamma Correction and Undercolor Removal requester which is displayed by clicking on Correct/Set (section 4.3.2.8).

Personal Paint's color correction and dithering routines were designed to go directly to the printer. Some "24-bit" printing utilities are available for the Amiga in replacement of normal printer drivers. These utilities do not receive 24-bit data from applications (at least not until version 3.2 of the Amiga operating system). They should not be used in combination with Personal Paint's 24-bit printing modes, unless all of their color correction options are disabled. Otherwise, different dithering patterns and color correction procedures overlap and interfere with each other, with very poor results.

Some Amigas are slowed down by system DMA operations when images in 256 colors are displayed. Bringing a 4-color Workbench screen to the front can speed up other programs, including printing with Personal Paint.

For optimum results in 24-bit printing, it is advised to set the highest Density supported by the printer driver (section 4.3.2.6). In particular, using the HP DeskJet printers with the drivers included with Personal Paint, Dithering should be set to Floyd-Steinberg, Threshold should be set to 1 (this turns off depletion by the driver) and Density to 7 (maximum shingling). While these settings reduce printing speed, they maximize print quality. With these settings, it is normally not necessary to make further adjustments to Personal Paint's Color Correction tables. Special ink-jet paper, or paper used for color copiers give best results.

4.3.2.8 Color Correction

In 24-bit printing mode, the Set gadget can be selected to tune the Gamma Correction and Undercolor Removal settings. Section 4.3.3.11 (Color Separation) has more on printing inks, while section 4.3.3.11.1 (Color Correction and Undercolor Removal) explains undercolor removal, which in 24-bit printing is similar to the same feature of Personal Paint's PostScript mode.

Personal Paint can correct each ink component (e.g. cyan, magenta, yellow or black) separately. The Component cycle gadget allows the user to switch between the individual correction tables.

Clicking on the graph reverses the notation. By default, low ink-density values are placed at the lower left of the graph. This is the traditional orientation used in the printing industry.

The Brightness and Contract knobs act as described in section 7.1.4 (Adjust Palette).

Ink smear and overlapping dots ("dot gain") cause the printer to respond in a non-linear way to the color information it receives from the computer. The Gamma Correction

function is used to compensate for this. Gamma values smaller than 1 make the image lighter. Values greater than 1 cause it to be printed darker. An appropriate gamma curve can drastically improve image quality, while at the same time limiting the loss of information to a minimum, if any.

The program default values can be adjusted in order to obtain a closer match between the picture which is displayed, and the printed image. To further tune the values to suit a particular image, it may be useful to print small, "critical" regions of the image using the Print Brush function.

4.5 Image and Screen Format

The Lock Display Mode gadget, to the right of the field indicating the selected screen mode, prevents the Load Image function from changing either the display mode or the setting of the Autoscroll option.

By activating this option, together with Autoscroll, it is possible to quickly view a series of images having the most different formats, while at the same time preventing flickering on multiscan monitors.

4.8.<3 Copy Animation

This command copies the entire animation to the other environment.

4.10 Information

4.10.1 Project Information

This requester provides information on the current image or animation, and allows the user to edit some annotations which can be saved together with the file.

The contents of the Author, Copyright and Annotation fields is normally stored inside the file when using the IFF (ILBM, ANIM, etc.), PNG or GIF formats, and as an Amiga filenote (file comment - maximum 80 characters) if other formats are used. No additional file information is stored if all fields are empty. In this case, an existing Amiga filenote is cleared, and no extension chunks (IFF, PNG or GIF) are stored.

The Annotation field may be useful to provide indications such as the author's address, trademark information related to the image, or particular techniques employed to create or process the image.

4.11 Memory Information

Memory occupied by each animation is included in the respective Environment field. Animations also require some RAM for screen buffers, which is accounted for in the Buffers field.

Three gadgets can be used to flush or free RAM in memory-critical situations.

When Flush is selected, Personal Paint moves as much RAM data as possible (Chip, Fast and virtual storage) to disk storage. This is useful to launch other software in an unexpected low-RAM condition.

Flush All goes beyond this, and its use should be limited to more critical situations: it frees any remaining buffers (such as the one used to display the brush with an image, rather than with a thin border) and may attempt to close the Workbench.

Free Undo frees all information stored in the Undo/Redo buffer. This is equivalent to pressing <Ctrl-u> in normal paint mode.

<6. The Animation Menu

An animation, as the name implies, is very much like a cinema film, or a cartoon made by photographing a series of drawings (called "frames"). Personal Paint offers a unique and powerful set of animation features. It allows users to easily manipulate frames or groups of frames through its visual Storyboard. The program exploits the ANIM standard better than other programs. This leads to improved file compression and gives more space to creativity. For example, it is possible to use more than one palette for different groups of frames, or program the exact time for which an individual frame is to be displayed during playback. It is also possible to resize, cut or stretch an entire animation as if it was a simple picture. The animation which is being edited doesn't even need to fit in Chip RAM, as Personal Paint can store frames in Fast RAM. The program can also quickly play animation files of any size directly from disk.

Personal Paint accepts and creates the following animation formats: ANIM-5, ANIM-7 (short and long-words), ANIM-8 (short and long-words) and hybrid files which may contain any combination of these frame formats. In general, ANIM-5 remains the most space-efficient and widely used format.

Personal Paint includes the original Auto ANIM save format, which, for each animation frame, selects the best compression scheme (ANIM-5, 7, etc.) Compared to pure ANIM-5 files, hybrid files may be up to 5-10% shorter, and still remain fully compatible with the official ANIM specifications.

ANIM-8 is an evolution of ANIM-5, just as ANIM-7 is, although ANIM-7 is generally considered to be superior. Compared to ANIM-5, both formats may achieve faster loading of animation files (and improved "Play File" performance).

Animations created with Personal Paint can be displayed by other commercial products, as well as by famous, freely distributable animation players, like *Viewtek* (which plays ANIM-7 starting from version 1.04) and *RTAP* (Real Time Anim Player) - both supporting multiple palettes and frame-by-frame timing.

Hundreds and hundreds of existing animation files could be made shorter by simply loading and saving them again with Personal Paint. This is because the program does some additional work (compared to other software) when it chooses how to compress bitplanes of frame data. The resulting files can still be read even by most of the very first ANIM-5 players.

Optimization can go even further. Many programs insert "dummy" timing frames just to have an image appear for longer time on the screen. All groups of identical frames can be stripped into a single frame with a new timing value. Personal Paint has a function to do exactly this.

For example, the original file containing the well-known "Amy Walks 2" animation, by Eric W. Schwartz, is 341276 bytes long. Saved again by Personal Paint, in the same ANIM-5 format (without frame stripping) it is 45 Kbytes shorter.

And the famous "Doggie's Inferno" cartoon originally occupies 153576 bytes. This is for 317 frames. But, apart from the less than ideal compression, 248 of these frames are identical to other frames, and only serve as time-fillers. With Personal Paint, this is not necessary any more. By stripping these frames and saving the animation again, the file ends up being only 84782 bytes: almost half the original length.

If an animation has smooth "fade-in" or "fade-out" effects, there is no need to have huge global color palettes: each frame or group of frames may have its own individual palette. The Storyboard includes a function to apply smooth palette variations to consecutive frames.

Personal Paint can load, manipulate and play animations using any palette-based screen mode. This includes support of all Amiga chip-sets and RTG graphic boards. When using

non-Amiga video modes (e.g. a third-party display card), it is important to keep in mind that the selected screen mode must support a feature called *double-buffering*. The software driver used with the RTG board should support double-buffering through Intuition library calls (this normally requires version 3.0 of the Amiga operating system). On all Amigas, double-buffering is a standard feature, supported by all versions of the operating system. Also, the frame size cannot exceed the maximum screen size (underscan, overscan and autoscrollback are OK). If these conditions are not met, an animation can still be edited, but not played. The Play File function supports additional display modes (e.g. HAM and HAM8).

Which file format is best? The ANIM-5 file format is the most accepted and widespread of all Amiga animation formats. It also achieves a better compression rate. The ANIM-7 format compensates in part for the additional overhead of playing animations which have large amounts of data per frame (e.g. animations which take advantage of the additional numbers of colors of AGA screen modes) directly from file. Once loaded in RAM, animations end up being the same regardless of the file format. However, if a 256-color animation has to be played from file, it can be much faster if it is stored in ANIM-7 format. While ANIM-7 is faster than ANIM-5 if played from file, it is not as space-efficient, nor as standard. Some animation programs cannot even load it. Two variants of ANIM-7 exist: ANIM-7S (short-word based) and ANIM-7L (long-word based). The latter format may be played even faster than ANIM-7S on some computers, but files are longer. ANIM-8 also has a Short and a Long variant.

<6.1 Load Animation

This function loads an animation from file. If the current environment already contains an animation in the same frame size as the one being loaded, a requester appears to select how new frames are to be loaded.

The following options are available:

Load New: clears the current animation and loads the new one;

Append: adds the new frames to the end of the current animation;

Insert Before: inserts the new frames before the frame specified through the proportional gadget displayed in the same requester;

Insert After: just like Insert Before, but frames are inserted after the specified frame.

Overwrite: the new frames overwrite existing frames, starting from the specified frame; frames exceeding the length of the current animation are appended at the end.

Animations are loaded in double-buffering mode, which allows the frames to be displayed as they are loaded. The <Esc> key can be pressed to stop loading frames (frames already loaded remain intact).

<6.2 Save Animation

After the usual file requester, a custom requester allows the user to select the file format (among the formats already described) and whether to save the entire animation, or only part of it.

An animation can only be saved if the current screen mode supports double-buffering, which is required for playing the animation. The correct screen mode information is stored by Personal Paint together with the animation (as required by the ANIM standard).

The "Full ANIM Optimization" flag is normally activated, and in most cases it shouldn't be necessary to change this setting. A few "primitive" pieces of animation software may not completely support certain compression modes, which have always been part of the ANIM standard. If this option is disabled, Personal Paint will not perform certain

optimizations which are normally very important to achieve a good compression, but which cannot be processed properly by the incomplete software. This feature has only been added to guarantee full compatibility with all animation players (even the oldest), and should be of interest only to the more technical-oriented users. In practice, it is easier to come across a rare piece of animation software which does not support multiple palettes and frame-by-frame timing (which are not related to this option), than finding one which cannot handle compression properly (e.g. single descriptors for multiple plane-differences).

<6.3 Play File

Personal Paint can play even the largest animations directly from file, even on computers with a standard memory configuration. This is also useful to view an animation before loading it. Play File does not affect the contents of the current environment (image, animation, etc.)

Some animations may impose too much overhead on a particular system to be played in real time (that is, smoothly). If the hardware or software cannot keep up with a particularly data-intensive animation, it may be wiser to store the animation in one of the ANIM-7 formats rather than using ANIM-5, as explained in the introduction to animation.

If there is sufficient RAM, Play File temporarily uses virtual memory (if it is switched on) to store the animation in the RAM storage area. This allows the animation to be played faster, and prevents unnecessary wear-out of the peripheral storage device whenever the computer is used for repeating an animation over and over again.

The short initial delay usually associated to loading an animation to RAM can be avoided by switching off the RAM Storage (section 8.<3.1) virtual memory setting. This may be especially useful when playing more than one animation from an ARexx script.

Play File will continue playing the animation, until <Esc> is pressed or a mouse button is clicked.

<6.4 The Storyboard

The Storyboard is a powerful visual animation editing tool. The Storyboard requester displays all frames in a thumbnail format, from left to right, top to bottom, as they appear in the animation.

If all the frames don't completely fit in the requester, the scroll bar can be used to move around. Both the requester and the frames can be resized. The requester has a resize gadget on the bottom-right corner, while the size of the reduced frames can be selected by pressing the right mouse button, and dragging the mouse to indicate the desired size. This information can be saved in the program settings files.

The number under each frame indicates the sequential position of that frame within the animation. During all actions, a parallel process creates, displays, maintains and updates the reduced thumbnail-images. If the frames are very similar to each other, it may be appropriate to select a larger frame size.

Three dots under a frame indicate frames having a palette differing from the current one. Double-clicking on a frame makes that frame (and its palette) the current one.

One or more frames can be "selected" by pressing the left mouse button and dragging the mouse over a number of frames. Selected frames are highlighted by a light border, and indicate the source or target of a storyboard operation. The current selection can be extended by holding down a <Shift> key and clicking on a frame. A cursor positioned between two frames indicates where frames would be inserted. The cursor is positioned with the mouse. A double-click on a frame makes that frame the current frame in the animation (that is, it is displayed in full-size in the background). In case of animations

having multiple palettes, having a current frame with the same palette as the thumbnails improves the quality and speed at which the thumbnails are displayed.

The top of the requester contains a series of gadgets. Many gadgets have an equivalent in the Palette requester (section 7.1.3). Others are special to the Storyboard.

The first two gadgets are used to add or insert new frames. The number in the string gadget indicates how many frames have to be inserted. The insertion point is marked by the cursor. Insertion occurs whenever the Add gadget is selected.

The following gadget is used to delete the selected range of frames.

To the right of the Delete gadget is the Insert gadget. It acts on the currently selected frames, and waits until the cursor is repositioned to insert a copy of these frames at the new insertion point (outside the source range). The source frames remain intact. To *move* a group of frames from one point to another, the Insert and Delete operations can be used in sequence.

The following gadget is the Copy gadget, which "copies over" a range of frames. It takes the source range and waits for a target range to be marked with the mouse. Then it copies the source over the destination. If the source contains less frames than the destination, then the source frames are repeated, one after the other. Both the source and the destination can, of course, be a single frame.

Copy Palette works exactly like Copy, but only copies the color palettes of the selected frames.

Like in the Palette requester, there are two color spread gadgets (Create RGB and HSB Range, section 7.1.3.6), which apply intermediate palettes to the frames between the first and last frames in the range.

The Restore gadget restores the animation as it was when the Storyboard was displayed. This function (like the Cancel gadget in the Storyboard) requires virtual memory to be active (section 8.<3.1).

Clicking on the Hide gadget temporarily hides the requester (as long as the mouse button is held down), in order to give a full view of the current frame.

The Delay string gadget indicates the timing value associated to the selected frame (or to the first of a range of frames). This time value, expressed in ticks (1 tick = 1/60th of a second), indicates for how long a frame has to remain on screen before the next one is displayed. A new value can be applied by typing a value in the string gadget and pressing <Return>. The new value is applied to all frames in the Storyboard range.

<6.5 Free Animation

This command releases the current animation. The current environment switches from animation mode to single picture mode. This command is required before loading an image, unless the image should be loaded into the current animation frame.

<6.6 Animation Frames

<6.6.1 Move to Frame

These menu subitems respectively allow the user to quickly jump to the previous or next frame, or to a frame specified by number. The keyboard shortcuts to these commands can be selected even while a painting tool is in use. For example, it is possible to keep using the same tool from one frame to the next (using the default <2> shortcut for Next Frame), without even releasing the mouse button.

<6.6.2 Add Frame

The Add Frame command adds a copy of the current frame immediately after it. The new frame becomes the current frame. Nice effects can be obtained, for example, by alternating "Add Frame" with image processing, resulting in progressive blurring or randomization, or other distortions.

If there is no animation, the first issue of Add Frame transforms the current image into a single-frame animation. A normal image is not treated as a single-frame animation.

<6.6.3 Optimize Frames

The Optimize Frames command searches for duplicate frames, generally created with other animation programs in order to have an image appear longer on the screen (the introduction to animation has a more detailed explanation of this). The frames are merged into a single frame, having a time-value equal to the sum of the time values of the original frames. The resulting animation is visually identical to the original, except that when it is stored to file it can occupy considerably less space.

<6.7 Play Animation

By default, the current animation is played from beginning to end (in all modes: Continuous, Once and Ping Pong). The Range selection requester allows the user to select a range of frames to be played in the Play Once and Play Ping Pong modes.

Play Continuous plays the animation from the first to the last frame. After the last frame, the animation is played again. This is repeated until a key or a mouse button are pressed. Play Once only plays the animation (or a range, if specified) once, while Play Ping Pong goes back and forth from the first frame to the last, and vice versa. In practice, during a "creative" session, the Range option is excellent for quickly checking the result of the most recent changes (using Play Once and Play Ping Pong), while Play Continuous can be used to see how everything fits together.

During animation, the standard Amiga keyboard shortcuts can be used to depth-arrange the screen (<Left Amiga>+<N>/<M>) or to drag it up and down (<Left Amiga>+<Mouse Drag>, or whatever specified in the IControl Preferences).

<6.8 Animation and the Other Program Functions

When the Clear tool (section 3.1.9) on the tool bar is selected with the right mouse button, the Clear Frames requester appears. This allows the user to clear (without removing) one or more frames.

The Image and Screen Format requester (section 4.5) can be used to modify the animation format. Animations can be stretched, cut, color-reduced etc., just like an image.

When an animation is color-reduced, Personal Paint may assign different palettes to the color-reduced frames, even if the original animation only had a single palette. This is caused by the fact that different frames may use different quantities of some colors, which are therefore assigned different priorities by the color reduction algorithm (section 8.6). This is the best technique to convert single frames, but seeing a common frame-background, or some objects common to more frames changing color from one frame to the other may be disturbing. To force a common palette (based on the palette of the current frame) to be used for the entire animation, one of the two <Shift> keys should be held down while the "New Animation Format" requester is closed (this requester is followed by the progress requester). This also speeds up color reduction (which is performed only once). As a feedback, the "Counting Pixels" progress requester appears.

When an image is made smaller without stretching it, it is "cut" between the current top left corner of the screen and the new bottom right corner (provided that the new image

format is identical to the new screen format). Animations can also be cut with an offset other than 0:0. First, the screen must be brought to the new size (without changing the image format). Once the screen exactly delimits the area of the frame to be preserved, the image format can be set to be identical to the screen.

Load Image (section 4.1) normally loads the picture into the current animation frame. If animation is no longer desired, Free Animation must be selected before loading the picture.

An entire animation can be copied to the other environment with the Copy Animation command (section 4.8.<3).

When the Palette requester or any other palette manipulation function (section 7.1) are used to modify the color palette, only the palette of the current frame is changed. The Storyboard can be used to apply a common palette to a range of frames.

7.1 Palette

It is easy to forget that it is always possible to move the mouse outside the requester and pick a color. In particular, the full palette which appears on the Tool Bar can be used while the palette requester is displayed.

7.2.3 Edit Stencil

Multiple colors can be selected or deselected with a single mouse click by dragging the mouse (with the mouse button pressed) over the color boxes in the the Stencil requester (just as in the tool bar palette). This is especially useful with large palettes.

<8. The Macros Menu

Personal Paint can be controlled by external ARexx programs. The name of Personal Paint's ARexx port is indicated under the program's Workbench Applcon. The name of the first port is always "PPaint". A list of available ARexx commands is returned by Personal Paint in the RESULT variable when the "Help" command is issued.

Documentation of ARexx commands is outside the scope of this manual. Additional developer documentation is available (please send E-mail inquiries to <ppaint_info@cloanto.it>).

8.<3 Memory Management

If memory was unlimited, this requester would probably not need to exist. In practice, RAM is a precious resource, and deciding how to make best use of it is frequently a matter of compromise. This requester allows the user to adapt Personal Paint to different requirements and configurations.

8.<3.1 Virtual Memory

The Virtual Memory settings allow the user to switch RAM and/or disk based virtual memory on or off. It is also possible to change the minimum amount of memory which Personal Paint will always leave free on each device. The default settings need normally not be changed. It is always a good practice not to allow virtual memory to completely fill a storage device.

Two storage locations can be used for virtual memory. One is intended to be in RAM, and one on a hard disk. RAM is usually faster, but more "precious", while hard disk space offers a good space/time compromise. Even using a floppy disk, there would still be a clear advantage: any operation which activates virtual memory would certainly fail if a feature like virtual memory didn't exist. From this point of view, it is always good to have

virtual memory.

Personal Paint tries to use RAM first. Although the RAM storage path (and device, e.g. "RAM", "RAD" or "VD0") can be selected by the user, the program assumes and may require that Fast RAM be available. The exact behavior depends on the RAM device being used: "RAM" requires Fast RAM, "RAD" does not (since, unlike others, its size is not dynamic). If the RAM location does not provide enough space, disk storage is used.

Virtual memory only becomes active when there is a "memory problem". Whenever this happens, a special "clean up" process occurs, in order to have only the most recently used items in Chip RAM, and store the less-used items in the RAM device and on disk. When an object stored in virtual memory needs to be displayed or processed, it is moved back automatically.

Personal Paint stores virtual memory items into separate files, which are deleted when they are not used any more, or when the program terminates. These files can be recognized by the ".vmem" file name suffix. If the program is still running when the computer is shut-down, any remaining virtual memory files are deleted when the program is run again. Virtual memory files can be very small, but are more likely to range in the dozens or even hundreds of Kbytes (otherwise, a system with a minimum of free RAM would probably not have required the use of virtual memory in the first place).

When handling virtual memory allocations, Personal Paint assumes that RAM is faster than the disk, also considering that it would still be better not to use virtual memory for an object subject to reuse (or at least, to keep it in RAM rather than on disk). The program therefore tries to optimize the combined use of all resources in order to provide faster access to the items which are used more frequently.

Although virtual memory is most useful to free Chip RAM, it also handles objects normally stored in Fast RAM (like animation frames other than the current one). The Storyboard undo buffer is always placed in virtual memory. If the undo buffer cannot be created as required (e.g. if virtual memory is disabled, or if there is no space beyond a safe minimum) the Storyboard Cancel gadget is "ghosted".

In general, hard disk space does not "breathe" as dynamically as RAM. Unless the hard disk is always nearly full, and huge files still have to be written from time to time, it may even be wise to set a lower minimum for the hard disk than for the RAM. In a multitasking, RAM-dependent environment like the Amiga, leaving some free RAM may be more important than having free space on the hard disk.

8.<3.2 Undo History

The undo history buffer records all changes applied to the image and to the color palette. Even if Personal Paint is quite "intelligent" in deciding how to keep a record of different types of changes, this can consume a lot of memory. Also, there is normally no need to store actions which are very old.

Two program parameters allow the user to set the maximum number of changes to be stored, and the maximum amount of memory which the undo history buffer may occupy. As the limits are exceeded, the oldest levels are freed.

Regardless of these settings, Personal Paint will always try to store at least one level of undo/redo. If the limit is explicitly set to a maximum of only one level (use of similarly low values is in general not recommended), then Undo and Redo become synonymous and, as in other packages, can be accessed with the same Undo command.

8.<3.3 Emergency Closing of Workbench Screen

In certain extreme conditions of RAM shortage, Personal Paint may attempt to close the Workbench screen to free some RAM (Chip or Fast, depending on the memory

requirement and the system display type). While this is normally acceptable, Personal Paint can be programmed not to automatically close the Workbench screen.

Once closed, the Workbench screen can be reopened manually at any time (section 8.16), and is reopened automatically when the program terminates.

8.7.2 Pattern Dithering

All pattern dithering procedures have been rewritten and greatly improved. This option is now almost as fast as no dithering at all, with a quality closer to that of Floyd-Steinberg dithering.

In particular, if the palette has only eight colors, and these colors are equal or similar to red, green, blue, cyan, magenta, yellow, white and black, Personal Paint can use even more efficient routines, which better exploit the even distribution of these colors.

Since regular dot-patterns are used, images processed with the Pattern Dithering option are compressed more efficiently when saved in the most popular file formats (compared to the more randomly distributed dots generated by the Floyd-Steinberg algorithm).

8.7.4 Best Quality

This option activates a set of professional color remapping procedures. These are slower than the default ones, but were designed using very advanced algorithms, normally used only in the broadcast industry.

When this option is off, additional speed gains can be noticed when there is more free memory available (up to 148 Kbytes may be used).

8.8.6 System (ASL)

The File Requester menu allows the user to replace the standard Personal Paint file requester with an ASL (Amiga Standard Library) compatible file requester, such as the Magic File Requester. A second requester appears to select the image format when saving a picture, unless the file name suffix indicates a file format. Recognized suffixes include: ".c", ".png", ".gif", ".iff", ".ilbm", ".lbm" and ".pcx". For example: "Clown.png" would automatically be saved in PNG format, but in the case of file names such as "Flower.pic" or "Painting", a format selection requester would appear.

8.9.4 Original

With this option, Workbench icons are never created. When Personal Paint overwrites a file that already has an icon, it does not change the existing image, but it does update the Tool Types fields. This is most useful when using Personal Paint for format conversions.

8.<13 Graphics

8.<13.3 Smooth Move

Normally, mouse movement messages which cannot be processed in real time are discarded by the Amiga operating system. When this option is active, Personal Paint allows for messages to be accumulated, so that tools like Continuous/Dotted Freehand and Airbrush can process mouse moves without loss of information. This is especially useful in very high resolution screens.

8.<13.4 Be Square

This option forces Personal Paint to override the ratio information provided by the Amiga Display Database, and to perform all drawing functions as if the pixels were exactly

square (1:1). This is especially useful when the current display mode uses "almost square" pixels, which can easily be compensated for by adjusting the monitor controls. When this option is active, circles, boxes and other shapes drawn by Personal Paint are built to an exact 1:1 ratio, even if the current Amiga display mode would indicate otherwise.

8.14 Backfill

This option tells the program to ignore the current background color when a brush is defined. With this setting, brushes defined in Rectangular mode have no transparency (NO_TRANSP flag in IFF-ILBM files), while in Freehand mode the entire region outside the marked area is considered to be transparent.

9.3 HP DeskJet Drivers

New HP DeskJet drivers (result of the joint development efforts of Cloanto and Commodore), are included on the program disk. These are the first versions of the drivers without the famous RLE compression bug. The 550C driver uses black ink in addition to cyan, magenta and yellow, and is not bound by the previous 10 inch size-limit. It also features improved cyan balancing code, compared to drivers previously released by Commodore.

The DeskJet drivers use the Threshold value to activate a driver-local correction table. Using Personal Paint's 24-bit printing with these DeskJet drivers, Threshold should remain set to 1 (= no correction), and Density values of 4, 5 or 6 (which activate depletion combined with different levels of shingling) are generally not required. A value of 7 only activates shingling, which improves print quality.

Several users have asked whether the enhanced HP DeskJet drivers supplied with Personal Paint support 600x300 dpi graphics output. It appears that some owners of DeskJet 560C and DeskJet 520 were misled by incomplete information. The advertised "600x300" printing capabilities of these models are mainly a result of RET (Resolution Enhancement Technology) applied to the 300x300 dpi print data. The printers cannot produce 600x300 dpi color graphics, and there is no documented command to send black & white graphics to the printer in 600x300 dpi.

9.4 JPEG DataType

The JPEG DataType software is included with the kind permission of Steve Goddard. It works on Amigas equipped with 68020 or higher CPUs. Additional documentation is provided in the "JPEG.datatype.guide" file, which can be displayed by AmigaGuide. To install the software, the JPEG file must be copied in Devs/DataTypes, and JPEG.datatype in Classes/DataTypes of the system disk.

The JPEG DataType may require a lot of memory for temporary files, which it stores in JPEGTMP:. It is useful to put an Assign command in the user-startup file, assigning JPEGTMP: to RAM: (if the system has a lot of memory) or to a peripheral storage unit.

9.5 Fonts

Personal Paint comes with several color fonts and a font named "Personal.font". All fonts can be installed by the installation procedures.

Personal Paint and the Personal Fonts Maker Color Extensions normally share the same Personal font for their user interface. The font itself has been upgraded a few times. On a system where different versions of these programs are installed, it may happen that one of the programs expects an older version of the font to be available. While minor changes are usually backwards compatible, if any characters appear to be incorrectly displayed it is sufficient to remove the font from the system FONTS: directory. All versions of Personal Paint and PFM2 also search for the font in their local directories, where the font is copied

during automatic installation.

If Topaz 8 is used for the Workbench icon texts, Personal 8 should be considered as a more readable replacement.

A. Program Messages

Animation is not possible: image larger than screen

As explained in the introduction to animation, the animation frame format cannot exceed the screen limits. It may be possible to open a larger screen by choosing a different screen mode, or by activating an overscan mode or by enabling autoscroll.

Animations cannot be merged

The Color Merge functions only handle images - not animations.

Error in file structure

Personal Paint recognized the file format and began processing the file, but at some point the data was inconsistent with the format specification. For example, this could indicate improper use of pad bytes in an IFF file.

Error opening diskfont.library version 34

Error opening icon.library version 33

The specified library does not exist, or its version number is lower than the one required.

... frames out of ... would be stripped

The Strip Frames function indicates how many frames would be removed, and asks for confirmation, before actually doing so.

Image data is incomplete

Personal Paint can now load incomplete or corrupt image files.

Incorrect version of Personal.font

This message usually appears only when a new version of Personal Paint is run for the first time. It indicates that the program, searching for its user interface font (named "Personal"), found an incorrect (probably older) version of the font. Normally, Personal Paint searches for the font inside the "PPaint:fonts" drawer (first choice) and in the system FONTS: directory (second choice). Any old "Personal.font" files stored in these directories are normally updated automatically by the installation procedure. The same should be done in case of manual installation. If different versions of Personal Paint or the Personal Fonts Maker need to be used on the same computer, and these programs require different versions of the Personal font, then the "Personal.font" file should be removed from the system FONTS: directory.

This message may also be displayed if a correct version of "Personal.font" has been installed, but the old Personal font is still in use by the system or by an application. If this is the case, executing the "Avail FLUSH" command from a Shell window or rebooting the system should solve the problem.

Section 9.5 has more on the Personal font.

Incorrect version of the user interface texts

It is likely that the program has not been installed properly, since it has found a user

interface file belonging to a different program version. This may happen, for example, when testing a new version of the program which has not yet been installed (but another version of the program is installed).

No frames to strip

The Strip Frames function has not found any duplicate frames.

No memory for undo

The Storyboard would not be able to undo the selected operation. If the operation is confirmed, the Undo and Cancel functions will be disabled.

Path incorrect

Virtual Memory uses this message to indicate that the given path could not be accessed. Personal Paint attempts to create the last directory of the path (usually the "t" directory), but the rest of the path name must refer to existing devices and drawers.

Studio server cannot be activated

The Studio Print mode was selected for printing, but the Studio Server software could not be activated. Most likely, the Studio software was not installed properly, or it is an older version of the software. The Studio Print Server software is supported from version 2 of the Studio and CanonStudio packages. Previous releases of Studio printer drivers can be accessed by selecting Personal Paint's "PRT" (System printer) print mode. In this case, it may be preferable to (also) activate Personal Paint's own 24-bit printing routines (section 4.3.2.4).

The animation can be viewed using "Play File"

Some animation formats (e.g. some rare HAM and HAM8 files) cannot be loaded and edited by Personal Paint, but only played from file.

The animation has been modified

The animation has been modified, but not saved yet. By proceeding with the operation requested, it would be lost.

The animation will be lost

Proceeding with the selected command would imply deleting the current animation. For example, changing the environment's compression mode may cause this message to be displayed.

The drawer is not empty

Delete was used to remove a non-empty directory.

The filter requires a brush

Some image processing filters use the current brush to apply certain transformations to the image. This message appears if no brush has been defined.

The filter requires an additional brush

Image processing effects such as Alpha Channel require two consecutive brushes.

The filter requires two environments

Stereograms and other effects require two environments (i.e. two images). The filters apply the changes to the current environment, using the other environment as a source.

The requested display mode does not support animation

The specified display mode does not support double-buffering. The introduction to chapter 6 ("Animation") explains this in more detail.

UIGraphics.pic cannot be loaded

The file containing the images used in Personal Paint's user interface could not be loaded. Possible causes include: file not found, insufficient memory, file corrupt. When editing the image, it is important that the reference lines used to delimit the areas in the picture be respected and not modified. Section 1.14.

Virtual memory settings cannot be changed

There is not enough storage space to move the virtual memory objects which are currently in use. The changes to the virtual memory settings are cancelled.

Virtual memory storage limit exceeded

This warning message indicates that one or both storage devices used for virtual memory already have less free space than the user-requested minimum. This may happen after changing a virtual memory storage device, or increasing the minimum values.

B. Command Shortcuts

In program requesters not containing any text gadgets, the <Return> and <Esc> keys can be used instead of the Proceed (or OK) and Cancel gadgets, in addition to other keyboard shortcuts which may appear underlined.

Key	Command	Section
<0>	Storyboard...	<6.4
<1>	Previous Frame	<6.6.1
<2>	Next Frame	<6.6.1
<3>	Go to Frame...	<6.6.1
<4>	Play Continuous	<6.7
<5>	Play Once	<6.7
<6>	Play Ping Pong	<6.7
<7>	Add One Frame	<6.6.2
<8>	Load Animation	<6.1
<9>	Save Animation	<6.2
<Alt-j>	Copy Animation	4.8.<3
<u>	Undo (One Level)	3.1.10
<U>	Redo (One Level)	3.1.10
<Amiga-u>	Undo All	3.1.10
<Amiga-U>	Redo All	3.1.10
<Ctrl-u>	Free Undo/Redo Buffer	3.1.10
<Alt-Cursor>	Scroll to End	3.2
<@>	Project Information	4.10.1

Program Startup

<F1> = Memory Save Mode

Drag and Drop

<Shift> = Play Animation (no loading)

String Gadgets

<Right Amiga-Return>, or

<Right Mouse Button> = Exit string gadget (e.g. to enter a keyboard shortcut)

File Requester

<Down>/<Up> = ListView

Font Requester

<Down>/<Up> = ListView (font names)

<Left>/<Right> = ListView (font size/attributes)

Mouse Movements

<Right Amiga-Cursor> = Accurate Move (ideal to define or position brushes)

Preview

<Space> or <Right Mouse Button> = Swap screens

<Esc> or <Left Mouse Button> = Terminate 24-bit/HAM View Mode

Area Settings

<Left> = Gradient Mode (<Shift-Left> to cycle backwards)

<Right> = Gradient Type (<Shift-Right> to cycle backwards)

Filter Requester

<Down>/<Up> = ListView

Clear Frames Requester

<Cursor Left> = Beginning of Range string gadgets

<Cursor Right> = End of Range string gadgets

Grab Screen

<Down>/<Up> = ListView

Image and Screen Format

<Down> = Copy screen size to image size

<Up> = Copy image size to screen size

Load Animation

<Esc> = Stop Loading

Save Animation Requester

<Cursor Left> = Beginning of Range string gadgets

<Cursor Right> = End of Range string gadgets

Storyboard Requester

<+> = Add Frames string gadgets

<0> = Delay string gadget

<Cursor Up> = Scroll Up gadget

<Cursor Down> = Scroll Down gadget

<Shift-Cursor Up> = Jump to first frame

<Shift-Cursor Down> = Jump to last frame

During animation

<Left Amiga-N> = Workbench Screen to Front

<Left Amiga-M> = Cycle to Next Screen

<Left Amiga>+<Mouse Drag> = Drag Screen

Play Range Requester

<Cursor Left> = Beginning of Range string gadgets

<Cursor Right> = End of Range string gadgets

Color Reduction (Animation)

<Shift> = Single Palette Mode

Palette Requester

<Up> = Scroll color bar to the left (keyboard autorepeat)

<Down> = Scroll color bar to the right (keyboard autorepeat)

Edit Stencil

Show Stencil must be mouse-activated (no keyboard shortcuts)

Color Statistics

<Left> = Scroll histogram to the left (keyboard autorepeat)

<Right> = Scroll histogram to the right (keyboard autorepeat)

Virtual Memory Requester

<Cursor Up> = Enable/Disable RAM storage

<Cursor Down> = Enable/Disable Disk storage

Save File

<Shift> = Use up to 256 colors for Workbench icons

C.1 Program Settings

DISPLAY (Amiga DisplayID - Section 4.5)

A value of 0xFFFFFFFF indicates to use the same screen mode as the Workbench screen. This was designed with the program startup files in mind. By default, Personal Paint is launched with the same screen mode as the Workbench, which avoids monitor flickering in combination with graphics boards.

FILREQ (File Requester Flags - Section 8.8)

The 6th bit in the FILREQ program setting is associated to the ASL (system) file requester option. The range for FILREQ is 0-63.

FILTER (Image Processing Filters - Section 3.1.4)

The second parameter (Filter Type) can be in the range 0-8 (6 = Environment Transparency, 7 = Brush Transparency, 8 = Stereogram).

The following notes apply to the Stereogram Filter Type.

A value of DivFac (Division Factor, range SHORTMIN .. SHORTMAX) greater than zero generates SIRDS (random dot) stereograms and indicates how many columns are to be created. This means that the pattern of random dots will be as wide as the image width divided by DivFac. Values of zero or less generate SIPS stereograms, which use the current brush as a pattern.

Bias (range 1 .. 16) allows the user to make some changes which affect the perceived quality of the stereogram. Lower quality stereograms (low Bias values) allow for more levels of depth, but may generate defects in certain shapes (e.g. thick vertical bars may appear thin). Higher quality images are easier to recognize, but their "flatness" (which is relative, because the contrast is excellent) leaves less room for different levels of depth.

BiasDx (range SHORTMIN .. SHORTMAX) is used as a Random Seed for SIRDS in general and for SIPS with Echo suppression. Negative values cause a different seed to be generated automatically each time the filter begins processing. Values >= 0 allow for exact reproduction of SIRDS, as the pattern remains constant for each single value.

BiasDy controls different other options, which are associated to its individual bits. The range is 0 .. 3, and the values must be added: 1 = Help Symbols (on top of image), 2 = Echo Suppression.

PATHBSH (Brush Default Path - Section 5.1)

PATHBSH = *"Path"*

PATHSET (Settings Requester Default Path - Section 8.1)

PATHSET = *"Path"*

UNDOLIM (Multi-level Undo - Sections 3.1.10 and 8.<3.2)

UNDOLIM = *MaxLevels, MaxBuffer*

MaxLevels range: 1 .. SHORTMAX (number of Undo/Redo levels).

MaxBuffer range: 1 .. LONGMAX (in bytes: 1 Mbyte = 1048576 bytes).

MaxBuffer indicates the maximum amount of memory (including virtual memory) which can be used to store the Undo levels (up to a maximum of MaxLevels Undo levels).

Once the maximum is reached, the oldest levels are progressively freed to leave room for the most recent levels.

Whatever the settings, one level of undo and redo is always guaranteed (even if it exceeds the memory limit set by the MaxBuffer setting).

VIRTMEM (Virtual Memory Settings - Section 8.<3.1)

VIRTMEM = *"Ram Storage", <Ram VM Enable>, <Ram MinFree>, "Disk Storage", <Disk VM Enable>, <Disk MinFree>*

Storage: quoted storage path.

Enable: 0 = disabled, 1 = enabled.

MinFree: expressed in bytes (1 Mbyte = 1048576 bytes).

WBCLOSE (Emergency Closing of Workbench Screen - Sections 4.11 and 8.<3.3)

WBCLOSE = *Permission Status*

0 = Not allowed, 1 = Allowed.

In case of RAM shortage, and if allowed to do so, Personal Paint may automatically try to close the Workbench screen to free some memory.

C.2 Environment Settings

LOCKDISP (Lock Display Mode - Section 4.5)

LOCKDISP = *Lock Activation*

0 = Unlocked, 1 = Locked.

PATHANIM (Animation Default Path - Section <6.1)

PATHANIM = *"Path"*

PATHCOL (Color Palette Default Path - Section 7.1.1)

PATHCOL = *"Path"*

PATHPIC (Picture Default Path - Section 4.1)

PATHPIC = *"Path"*

PATHPLAY (Play Animation File Default Path - Section <6.3)

PATHPLAY = "*Path*"

PATHPS (PostScript Output Default Path - Section 4.3.3.5)

PATHPS = "*Path*"

PATHSTEN (Color Stencil Default Path - Section 7.2.1)

PATHSTEN = "*Path*"

PRINTCOR (Printer Color Correction - Section 4.3.2.8)

PRINTCOR = *GraphType, GrayBrightness, GrayContrast, GrayGamma, CyanBrightness, CyanContrast, CyanGamma, MagentaBrightness, MagentaContrast, MagentaGamma, YellowBrightness, YellowContrast, YellowGamma, BlackBrightness, BlackContrast, BlackGamma, UcrM, UcrY*

GraphType: 0 = Normal Graph, 1 = Reversed Notation.

Brightness and Contrast range: -100 .. 100.

Gamma range: 1000 .. 160000 (in units/10000, i.e. 0.1 .. 16.0)

UCR range: LONGMIN .. LONGMAX (in percent/10000 - 0% = No Correction)

PRINTSYS (System Printer Settings - Section 4.3.2)

Shade: 4 = "8-bit Gray", 5 = "24-bit Color".

SBOARD (Animation Storyboard - Section <6.4)

SBOARD = *ThumbnailWidth, Columns, Rows*

Width: In low-resolution pixels.

Columns: Frames (thumbnail-format) per row.

Rows: Number of thumbnail rows.

C.3 Read-Only Settings

The following program settings are dedicated to the more technical users. Personal Paint does not write these settings. They can only be inserted in a file using a text editor or a word processor such as Personal Write.

REDBITS, GREENBITS, BLUEBITS

REDBITS = *RedBits*

GREENBITS = *GreenBits*

BLUEBITS = *BlueBits*

Range: 0 .. 8 (0 = Display Mode Default; All set to 8 = 24-bit palette)

This option forces Personal Paint to use a certain number of bits for each color component in the color palette, regardless of the hardware being used.

For example, to emulate the limitations of an Original Chip Set system on an AGA computer, all three values should be set to 4. Conversely, in order not to lose information when working with some common 12-bit or 18-bit hardware (e.g. ECS systems, or Picasso graphics boards), all three values should be set to 8.

Interesting image processing effects can be obtained by selecting low values (e.g. 1 to emulate CMYK/RGBW devices).

THICKX, THICKY

THICKX = *HorizontalThickness*

THICKY = *VerticalThickness*

These settings determine the horizontal and vertical thickness of most user interface items (tools, borders, bars, etc.) A value of 0 indicates dynamic thickness (i.e. selected by the program depending on the screen size), 1 = single thickness, 2 = double-thickness, 3 = quadruple-thickness, and so on. In practice, manual thickness setting never causes objects to appear larger than they would with the option set to 0. Otherwise, some requesters would not fit on the screen.

Range: 0 .. 128.

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This is one of the first “different” Amiga CD-ROMs. The Personal Suite CD-ROM contains no public domain or shareware software. Everything is high-quality. Our goal was not to fill a CD-ROM, but to find some of the best in different fields, with a preference for material not available on other Amiga CD-ROMs. The commercial titles are the latest versions available, with full AmigaGuide manuals (English and German, with some titles also in Italian and French).

The capacity of the CD-ROM made it possible to include an enhanced version of Personal Paint with extended documentation. Famous Amiga artists like Jim Sachs and Karl Bihlmeier participated with a selection of their best Amiga art. Also included, a compilation of animations by Eric Schwartz, for the first time in IFF ANIM format. More people contributed to put together more quality material than could be named here.

The Personal Suite CD-ROM is packaged in an elegant metal box.





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